FINAL

VOLUME II OF II
REVISED

LEACHATE COLLECTION SYSTEM EXPEDITED FINAL DESIGN

BLACKWELL FOREST PRESERVE LANDFILL
DUPAGE COUNTY, ILLINOIS

MAY 1997

PREPARED FOR:
FOREST PRESERVE DISTRICT
DUPAGE COUNTY, ILLINOIS
•••
PREPARED BY:
MONTGOMERY WATSON
ADDISON, ILLINOIS

PROJECT NO. 1252008.04090050

MONTGOMERY WATSON

TABLE OF CONTENTS

VOLUME I OF II

1

2

3

LIST OF FIGURES

LIST OF DRAWINGS

LIST OF APPENDICES

VOLUME II OF II

E

E

SITE SAFETY PLAN

SITE SAFETY PLAN

BLACKWELL FOREST PRESERVE LANDFILL
DU PAGE COUNTY, ILLINOIS

MAY 1997

PREPARED FOR:
FOREST PRESERVE DISTRICT
DU PAGE COUNTY, ILLINOIS

• • •

PREPARED BY:
MONTGOMERY WATSON

PROJECT NO. 1252008.0409

TABLE OF CONTENTS

6

7

8

9

LIST OF APPENDICES

J:\1252\008\04\WP\RPT\95X_TOC.DOC

1

SITE SAFETY PLAN (SSP)
KEY PERSONNEL

Site Manager: To be determined

Site Safety Officer: To be determined

PROPOSED PROJECT START DATE
June 1, 1997

This Site Safety Plan does not supersede or in any way relieve subcontractors of their obligations under any applicable OSHA regulations including 29 CFR 1910: Occupational Safety and Health Standards and 29 CFR 1926: Health and Safety Regulations for Construction.

Montgomery Watson personnel working at this site meet the training and medical monitoring requirements of 29 CFR 1910.120: Hazardous Waste Operations and Emergency Response. Documentation of this training and medical surveillance can be obtained upon written request to Montgomery Watson, Health and Safety Coordinator, 2100 Corporate Drive, Addison, Illinois.

The health and safety procedures set forth in this Site Safety Plan (SSP) are based on the site conditions and chemical hazards known or expected to be present using site data available at the time this SSP was written. This SSP is intended solely for the use of Montgomery Watson personnel and Montgomery Watson subcontractor personnel during the activities described in this SSP. Montgomery Watson subcontractors are required to prepare their own SSP to cover their work activities which are not included in this SSP. This SSP is subject to review and revision by Montgomery Watson's Corporate Health and Safety Manager (HSM) or designated alternate when it is deemed necessary by actual site conditions encountered during the field activities.

J:\1252\008\04\WP\RPT\95_H&S.DOC

2

SITE SAFETY OFFICER (SSO) RESPONSIBILITIES

The Site Safety Officer (SSO) is responsible for field implementation of this SSP and enforcement of safety rules and regulations. The SSO will handle liaison with Montgomery Watson subcontractors on matters relating to health and safety. Other site-specific SSO functions include:

- Verify that utility clearance has been performed.
- Oversee day-to-day implementation of the SSP by Montgomery Watson Subcontractor employees.
- Interact with Montgomery Watson Subcontractor project personnel on health and safety matters.
- Determine levels of protection.
- Provide "refresher" training to new Montgomery Watson and Montgomery Watson Subcontractor site personnel on health and safety matters.
- Document that Montgomery Watson and Montgomery Watson Subcontractor site personnel have received proper training and participate in a medical surveillance program.
- Inspect and maintain (daily) safety equipment which includes calibration of air monitoring instrumentation.
- Perform or direct ambient air quality monitoring as warranted.
- Modify SSP as needed and notify appropriate persons of changes.
- Investigate and report on-site accidents/incidents.
- If Montgomery Watson employees enter excavations, act as the competent person and ensure OSHA excavation requirements are enacted.
- Document that Montgomery Watson and Montgomery Watson Subcontractor site

personnel are familiar with the hospital route, and that the route map is posted in the work trailer or site vehicles.

- Establish detailed procedures and routes for evacuation from the site.

- In conjunction with the LCS Contractor, establish the Exclusion, Decontamination and Support Zones at the site, as necessary, and provide means of securing the work area.

- Implement and direct confined space entry procedures if under the scope of work.

The SSO will hold initial startup and daily safety briefings with Montgomery Watson staff and Montgomery Watson Subcontractors. The SSO will complete the comprehensive and daily checklists found in Appendix A when conducting the briefings.

The SSO will report accidents such as injury, overexposure, or property damage to the HSM, and will consult with the HSM, and Project Coordinator on specific health and safety issues arising over the course of the project. The SSO has the authority to shut down operations if unsafe conditions exist and/or if the SSP is not followed. A comprehensive site health and safety checklist is presented in Appendix A.

J:\1252\008\04\WP\RPT\95_H&S.DOC

3

SITE DESCRIPTION/HAZARD SUMMARY

SUMMARY OF HAZARDS KNOWN OR SUSPECTED TO BE PRESENT

- Heavy metals
- Organic materials
- Hydrogen cyanide
- Vinyl chloride
- Temperature stress
- Heavy equipment operation
- Severe weather
- Biological Hazards
- Refuse

SCOPE OF WORK

- Leachate Collection System Installation
- Refuse Spoils Containment Area Construction

SITE OVERVIEW

The landfill is located approximately 6 miles southwest of downtown Wheaton, Illinois in Section 26, T39N, R9E, DuPage County, Illinois. The site is currently part of DuPage County, Illinois Forest Preserve District and is called the Roy C. Blackwell Forest Preserve. The forest preserve consists of a large hill formed from the landfill, three artificially constructed lakes, campgrounds, picnic areas, hiking trails, and roads.

CHEMICAL HAZARD SUMMARY

Matrix	Compound	Max. Conc. Expected	Location
soil/debris/	VOCs	unknown	construction area
leachate	chlorinated hydrocarbons	unknown	construction area
soil/debris/	metals	unknown	construction area
leachate	cyanide compounds	unknown	construction area

Chemical hazard summary sheets are included in Appendix B.

J:\1252\008\04\WP\RPT\95_H&S.DOC

4

SITE BOUNDARIES AND ENTRANCE/EXIT

SITE AND PROJECT BOUNDARIES

Appendix C of the SSP contains a hospital route map and site location map.

PRESENT SITE SECURITY

Site is not secure. Site security measures are presented in the Design text and Specifications.

SITE SECURITY UPGRADES NEEDED

A sign-in/sign-out log will be maintained at the site trailer. Any persons entering or leaving the site work area will be required to sign the log. Fencing and/or barricades, as deemed appropriate by the SSO, and warning signs, will be installed around investigative and construction areas at a minimum distance of 20 feet from field operations. Fencing and warning signs will be installed around any refuse spoils containment areas.

ZONES OF CONTAMINATION

Generally, the area within 20 feet of construction field operations is considered the Exclusion Zone. Exclusion Zone boundaries need to be marked at a minimum with yellow caution tape. These areas, which include areas both inside and outside the limits of waste, will change as work progresses across the site. Construction operations include activities such as excavating, trenching, drilling/boring, soil or refuse stockpiling, concrete and structural work, and electrical service wiring.

The Decontamination Zone, which includes the area immediately surrounding the Exclusion Zone, lies at the interface of the Exclusion Zone and the Support Zone. The Support Zone extends in most cases to the approximate limits of waste, but extends further to include equipment and materials storage and staging areas.

ENTRY RESTRICTIONS

The buddy system is required at all times when work is performed within the Exclusion and Decontamination Zones.

ENTRANCE TO BE USED

Use public entrances to access the Blackwell Forest Preserve site. Landfill work areas access to be determined during pre-construction meetings.

CHECK-IN REQUIRED

A sign-in/sign-out log will be maintained at the site trailer.

WORK HOURS

Refer to the Expedited Final Design Specifications Section 01010 - Summary of Work for work hours and work days restrictions.

J:\1252\008\04\WP\RPT\95_H&S.DOC

5

GENERAL SITE HEALTH AND SAFETY CONSIDERATIONS

WEATHER CONDITION RESTRICTIONS

The Site Safety Officer (SSO) has the authority, should severe weather threaten, to place site activities on standby, cease operations and/or evacuate the site as deemed necessary.

Weather conditions on-site can not be controlled. Site personnel are to be aware of the warnings of impending severe weather and the precautions that are to be taken when severe weather threatens. Refer to the SOP for Severe Weather found in Appendix D.

TEMPERATURE STRESS

Hot or cold weather is generally a consideration at any site and can not be controlled. Site workers need to be aware of engineering controls which can reduce temperature stress, the signs and symptoms of temperatures stress and first aid measures for victims of temperature stress. Refer to the SOP for Temperature Stress found in Appendix E.

GENERAL SITE HEALTH AND SAFETY RULES

Some general safe work practices apply to all sites. Refer to the SOP for General Site Health and Safety Rules found in Appendix F.

HEAVY EQUIPMENT

- Special safety procedures are required when working around operating heavy equipment. Heavy equipment includes, backhoes, scrapers, loaders, bulldozers, trucks and drill rigs. Hazards associated with operating heavy equipment include obstructed view, moving parts, rollover, overhead clearance, noise and dust.

- Heavy equipment must be operated by trained, authorized personnel.

- Equipment must be inspected daily.

- Equipment must be equipped with backing alarms and if driven over uneven terrain rollover protection and seat belts.

- Personnel working on the equipment or in the area must wear safety glasses with side shields, steel-toe steel-shank safety boots, and hard hats.

- A spotter must be used when backing up to avoid blind spots.

- All guards must be in place and safety switches should be operational.

- Drill rigs and other equipment with tall booms should, at a minimum, remain at least 10 ft from overhead power lines and must not be moved with the boom raised.

TRAFFIC

If personnel will be in a roadway or within 10 ft of a roadway during work activities, orange safety vests must be worn. Barricades and warning signs and/or cones may be required. The SSO will determine if additional measures are warranted and will implement necessary control measures. Follow the procedures in Appendix F - General Site Health and Safety Rules.

BIOLOGICAL HAZARDS

There is a potential for additional hazards at the site which include biological hazards.

- Biological - Occupationally induced infection can occur in any occupation as a result of exposure to bacteria, viruses, fungi, or parasites. A simple laceration from a sharp edge can become secondarily infected with staphylococci or streptococci. A thorn, a wood splinter, or a metal slug acting as a foreign body can pave the way for secondary infection of the skin. Cuts, scrapes, or other lacerations will be cleaned, disinfected, and dressed immediately following standard first aid procedures.

- Plants - A broad variety of plants and wood cause injury to skin through primary irritation or allergic sensitization. Although the chemical identity of many plant toxins has not been established, it is well known that an irritant or allergenic agent can be present in the leaves, stems, flowers, bark, and other components of the plant. Examples include, poison ivy and sumac. Personnel will be wearing long pants at the site. If work is to be performed in areas with poison ivy or sumac, contact with the plant should be avoided. The SSO will identify locations where poisonous plants are present during daily site briefings. Personnel may need to

wear gloves or chemical resistant clothing (Tyvek). If contact is made with poison plants, remove contaminated clothing, wash all exposed areas with soap and water followed by rubbing alcohol. Apply calamine or other soothing skin location. Seek medial advice if severe reaction occurs.

- Insects - Insect bites and stings can be serious to hypersensitive persons and even deadly depending on the type of insect. Examples include bees, wasps, hornets, brown recluse spiders, and ticks. Lyme disease is a tick-borne disease and starts out with flu-like symptoms but may lead to arthritis and serious nerve and heart damage. Avoid tall grassy areas or other areas of thick vegetation. If work is performed in these areas, personnel should wear light colored clothing, tape pant's cuffs around their ankles, use a commercially available repellent and check for ticks regularly.

- Animals - Animal bites are a concern because of the potential for the animal to carry the rabies virus, which attacks the nervous system. If an animal bite occurs the victim must be taken to the nearest medical facility immediately.

EXCAVATIONS

Operations at the site will include excavating soils for the LCS. Excavations will comply with OSHA 29 CFR 1926 Subpart P, regulations. Montgomery Watson personnel will enter the excavations only as necessary. Excavations will be barricaded or filled in at the end of the day by the SSO to prevent unauthorized entry into the excavations. See Appendix K for safety considerations when performing excavations.

UTILITIES

Utilities must be cleared by the LCS Contractor before performing any intrusive activities. The SSO will check that utilities have been cleared before work begins at the site.

NOISE

Hearing protection is required when working in close proximity to heavy equipment, the level of noise interferes with communications or the sound level exceeds 85 dB. Generally, if you cannot hear someone speaking at a normal conversational level when they are 3 ft from you, you need hearing protection. **Hearing protection is required within 50 ft of the following operations:**

- Driving casing or the split spoon sampler
- During core drilling
- Use of power tools
- Use of air compressor

- Use of other machinery

CONFINED SPACES

Confined space entry by Montgomery Watson personnel is not allowed under the scope of this SSP. Should a confined space entry situation be encountered, the Health and Safety Manager must be notified and provisions for confined space entry must be added to this SSP. These provisions would comply with 29 CFR 1910.146 (Permit required confined space entry regulations). An SOP for confined space entry is presented in Appendix J.

FALL HAZARDS

If work is performed on an elevated level 6 feet above the ground or work surface, fall protection is required. Fall protection may still be necessary for heights less than 6 feet in certain situations if there is a potential for injury from falls at lower heights. These may include falls onto protruding rebar or other sharp objects. The SSO will be responsible for implementing the fall protection program as outlined in Appendix F - General Site Health and Safety Rules. Ladders also pose a significant hazard associated with falls. The guidelines in Appendix F should also be used if ladders are present at the site.

WATER HAZARDS

Workers working near water, where a danger of drowning exists will wear U.S. Coast Guard approved life jackets. The SSO will inspect life jackets before and after each use. Defective life jackets will be taken out of service and destroyed. When working from boats or barges ring buoys with at least 90 feet of line will be available for emergency rescue. A lifesaving skiff will be available when working from barges for rescue purposes.

ELECTRICAL HAZARDS

Electrical Cords

Electrical cords passing through work areas should be covered or elevated to protect the cord from damage and reduce hazards to employees.

Extension cords used with portable tools will be 3-wire type and will be protected from damage when in use. Extension cords must be inspected on a routine basis. Cords with cuts in the insulation or that are worn or frayed or have insulation pulled back from the plug or receptacle fittings will be taken out of service immediately.

Grounding

Portable tools and other electric equipment will be grounded or double insulated. Ground fault circuit interrupters (GFCIs) will be used in wet areas and on all field sites and outdoor

operations. Extension cords used on site must always be used in conjunction with GFCIs.

HOT WORK

Hot work involves the use of open flames or other sources of heat around possible sources of flammable vapors. Hot work to be performed under the scope of this site safety plan includes welding.

The SSO will be responsible for fire control measures as outlined in Appendix F - General Site Health and Safety Rules.

LIFTING/MATERIALS HANDLING

Lifting and materials handling are hazardous during operations. Follow the procedures outlined in Appendix F - General Site Health and Safety Rules when lifting objects or handling materials.

J:\1252\008\04\WP\RPT\95_H&S.DOC

6

CHEMICAL HAZARD EVALUATION/ AIR MONITORING STRATEGY

The following air quality parameters will be monitored during work activities:

- Oxygen Level
- Combustible Gases
- Hydrogen Cyanide
- Vinyl Chloride

Volatile Organic Compounds (VOCs)

MSDS equivalents for specific compounds noted above are included in Appendix B.

AIR MONITORING STRATEGY

Oxygen

A direct reading oxygen meter will be used to determine the percent of oxygen in the atmosphere. A Gastech Model 1939 OXY, or equivalent will be used on-site.

Instrument Reading	**Action to be Taken**
<19.5% or >23.5%	Cease operations and move to a safe area. Re-evaluate the work plan. Engineering controls such as forced ventilation and use of non-sparking tools are to be implemented if operations are to continue. **DO NOT CONTINUE WORKING UNTIL OXYGEN LEVELS ARE BETWEEN 19.5 AND 23.5%.** When oxygen levels are outside this range, combustible gas meter readings are not reliable.

Combustible Gases

Action levels are based on the readings of a combustible gas meter. The readings are generally given as a percentage of the lower explosion limit (% LEL). A Gastech Model 1939 OXY, or equivalent will be used on-site.

Instrument Reading	Action to be Taken
0 to 10% LEL	Continue working and monitoring the atmosphere for combustible gases. Inform personnel working in the area whenever readings are >5% LEL.
10 to 20% LEL	Continue working with caution. Inform personnel working in the area of the readings. Be prepared to cease operations.
> 20% LEL	Cease operations and move to a safe area. Re- evaluate the work plan. Engineering controls such as forced ventilation and use of non-sparking tools are to be implemented if operations are to continue. **DO NOT CONTINUE WORKING UNTIL CONDITIONS ARE CONSISTENTLY BELOW 20% LEL.**
NOTE	When oxygen levels are above 23.5% or below 19.5%, combustible gas meter readings are not reliable.

Hydrogen Cyanide (HCN)

A direct reading HCN meter will be used to determine HCN levels. The computer model 4100 SD monitox monitor will be used on-site. Whenever there is any positive reading on the HCN meter, cease work immediately and contact the Site Safety Officer (SSO) who will be determined at the time of field activities or which is Mike Kierski in Madison, Wisconsin. The TLV-C (ceiling) for HCN is 4.7 PPM, and the alarm is set for 4 PPM.

If approval is given by the SSO or HSM, verification of the presence of HCN is to be made using colorimetric tubes which can detect HCN. The person taking the sample is to wear appropriate respiratory protection. There is no air-purifying cartridge approved for use in an atmosphere containing HCN. A supplied-air respiratory must be used.

If the presence of HCN is confirmed, cease activities and contact the HSM. If the colorimetric tubes do not indicate the presence of HCN, continue with site activities cautiously and continue to monitor for HCN with the direct reading meter.

Vinyl Chloride

Whenever any reading above background is noted with the organic vapor monitor, colorimetric tubes will be used to verify the presence of vinyl chloride. If vinyl chloride is found to be present above 1 ppm, personnel will cease operations and contact the Health and Safety Manager. There is no air-purifying cartridge approved for use in an atmosphere containing vinyl chloride. A supplied-air respirator must be used.

Volatile Organic Compounds (VOCs)
Equipment:

Thermo-Environmental photoionization meter model 580B OVM with a lamp rating of 11.7 eV, or HNU Systems, Inc. photoionization detector (PID) Model 101 with a lamp rating of 11.7 eV.

Action Levels:

< Background: Level D or D-Modified*

< 5 Instrument Units above background: Level C

5 to 50 Instrument Units above background: Level B

≥ 50 Instrument Units above background: Cease operations and move to a safe area. Contact the Health and Safety Manager and re-evaluate the Work Plan.

* Level D is to be used when there is no dermal contact with contaminated materials. Level D-Modified is to be used when there is dermal contact with contaminated materials.

Dust
Dust generation would be expected during test pit excavations. Dust may contain hazardous materials and is an inhalation hazard. The SSO will upgrade to Level C if dust is observed.

FREQUENCY

Perform air monitoring whenever any of the following situations arise:

- Upon initial entry to a site to rule out IDLH conditions
- Work begins at a different portion of the site
- New contaminants are noted
- A new/different phase of work is started
- Work is being performed in areas with obvious liquid contamination
- Intrusive activities
- Continuously during confined space entry

Monitoring should be performed on personnel with the highest potential exposure. If samples are being collected in jars, use monitoring equipment to determine the level of contaminants in the breathing zone of the person collecting the samples. Do not use instantaneous readings to determine the level of protection. Readings should be persistent unless "pulses" of vapor exceed STEL or Ceiling levels. Monitoring should also be

performed at the source of chemical hazards such as boreholes and the surface of contaminated materials but upgrades are based on breathing zone concentrations.

CALIBRATION REQUIREMENTS

Calibrate all monitoring equipment at the beginning and end of each work day.

Calibration data will be recorded in a bound field notebook or in the field notes. Documentation should include:

- Date/time
- Zero reading before calibration
- Concentration of calibration gas
- Reading obtained with calibration gas before adjusting span
- Final reading obtained with calibration gas after adjusting span

When air monitoring is required, take area air samples at the following locations daily. Record time, location and results of monitoring and actions taken based upon the readings:

- Upwind of work areas to establish background air contaminants
- In Support Zone to check for contamination
- Along decontamination line to check that decontamination workers are properly protected and on-site workers are not removing protective equipment in a contaminated area
- Exclusion Zone to verify level of protection and Exclusion Zone boundaries
- Downwind of work area to track any contaminants leaving site

Use the SOPs for equipment calibration in the Montgomery Watson Instrument SOP Manual.

REQUIRED PERSONAL PROTECTIVE EQUIPMENT

Level D

- Work Uniform
- Safety Boots - Steel toe/steel shank
- Hard Hat
- Safety Glasses with side shields*
- Face Shield*
- Hearing Protection*

Level D-Modified

- Safety Boots - Steel toe/steel shank
- Hard Hat
- Safety Glasses with side shields*
- Face Shield*
- Hearing Protection*
- Outer Gloves - MOC: Neoprene or Nitrile
- Boot Covers - MOC: latex
- Chemical Resistant Clothing - MOC: Tyvek
- Inner Gloves - MOC: nitrile

Level C

- Safety Boots - Steel toe/steel shank
- Hard Hat
- Face Shield*
- Hearing Protection*
- Outer Gloves - MOC: Neoprene or Nitrile
- Boot Covers - MOC: latex
- Chemical Resistant Clothing - MOC: Tyvek
- Full-Face Air Purifying Respirator
- Respirator Cartridge - Type: OVA/Hepa
- Inner Gloves - MOC: nitrile

Level B

- Safety Boots - Steel toe/steel shank
- Hard Hat
- Face Shield*
- Hearing Protection*
- Outer Gloves - MOC: Neoprene or Nitrile
- Boot Covers - MOC: latex
- Chemical Resistant Clothing - MOC: Tyvek
- Positive Pressure/Pressure Demand Self Contained Breathing Apparatus or Airline Respirator with Escape Bottle
- Inner Gloves - MOC: nitrile

* Optional PPE - Use as needed.

Note: Safety glasses are required within 50 ft of operating equipment, tools or machinery. Face shields are required during operations that may cause materials to fly into or spray the face. These include:

- Sawing metal or concrete
- Grinding or sanding operations
- In the vicinity of drilling operations when mud and liquids are sprayed in the work area
- When opening drums or tanks when hazardous materials under pressure are potentially present
- Cutting with a torch or when welding

TASK SPECIFIC LEVELS OF PROTECTION

Activity: LCS Construction

Entry-Level D

Upgrade to Level B or C protection during installation LCS components into the landfill, by the SSO, as appropriate, with air monitoring results and changing site conditions.

ROUTINE DECONTAMINATION

Use the SOP for Decontamination at the highest level of protection used on-site each day, found in Appendix G.

J:\1252\008\04\WP\RPT\95_H&S.DOC

7

INVESTIGATION DERIVED MATERIALS DISPOSAL

DISPOSABLE CLOTHING/EQUIPMENT

Dispose in refuse containment area.

DECONTAMINATION WATER

Water generated during decontamination solutions will be discharged to the leachate holding tank, or contained for disposal at a permitted WWTP facility. Additional decontamination information is presented in Appendix G.

EMERGENCY ROUTES

See Appendix C for a map showing the route to the hospital.

Driving Directions
Exit forest preserve east (left) onto Butterfield Rd. (Rt. 56) and travel to Winfield Road. Turn north (left) on Winfield Road and travel to Central DuPage Hospital, located on east side (right) of Winfield Road. Emergency routes are to be verified by the SSO and communicated to site personnel prior to site activities.

EMERGENCY PROCEDURES

Emergency Equipment
Staff must have a standard first aid kit, emergency eyewash, and 5 lb ABC fire extinguisher at the site.

Emergency Decontamination
Refer to the SOP for Emergency Decontamination found in Appendix G.

Site Evacuation

The evacuation signal for the site is three short blasts of a horn, either on a motor vehicle or an air horn. Evacuation routes and assembly points are to be determined at the site. Site workers are to be notified of routes and assembly points by the SSO during the daily safety meetings. Refer to the SOP for Emergency Response found in Appendix H for more details on site evacuation.

First Aid

Refer to the SOP for Chemical First Aid found in Appendix I for general chemical first aid procedures. Standard first aid and CPR procedures should be used in other medical emergencies. Montgomery Watson field personnel are trained in First Aid and CPR. Each first aid kit contains protection equipment that must be worn while performing first aid and CPR. This includes:

- Disposal gloves
- Disposable mouth-to-mouth resuscitator
- Safety goggles/face mask
- Disposable overgarment

Whenever first aid procedures are performed on another person, the Health and Safety Manager must be notified immediately. Montgomery Watson field personnel are trained according to the OSHA Bloodborne Pathogen Standard.

J:\1252\008\04\WP\RPT\95_H&S.DOC

8

EMERGENCY INFORMATION

	Address	Telephone	Contact Person
Ambulance		911 or *999	
Hospital E/R	Central DuPage Hosp. 25 North Winfield Rd. Winfield, Illinois	708-682-1600	
Poison Control	Chicago	800-942-5969	
Police		911 or *999	
Fire		911 or *999	
Utilities	J.U.L.I.E.	800-942-0123	
Chemtrec		800/424-9300	

Note: When using a mobile telephone *999 only works on state highways. Otherwise dial "0" for operator assistance to direct you to the appropriate emergency service.

Emergency Contacts	Name	Business Phone	Home Phone
Project Manager	Peter Vagt	708-691-5020	708-665-1629
Project Engineer	Dean Free	608-231-4747	608-544-5382
Site Safety Officer	To be determined		
H&S Coordinator	To be determined		
Corporate H&S Manager	Beth Darnell	714-222-1844	NA
Regional H&S Manager	Mike Kierski	608-231-4747	608-544-4302

EMERGENCY ROUTES

See Appendix C for a map showing the route to the hospital/clinic.

Driving Directions
Exit forest preserve east (left) onto Butterfield Rd. (Rt. 56) and travel to Winfield Road. Turn north (left) on Winfield Road and travel to Central DuPage Hospital, located on east side (right) of Winfield Road. Emergency routes are to be verified by the SSO and communicated to site personnel prior to site activities.

EMERGENCY PROCEDURES

See Appendix H for additional field emergency response procedures.

Emergency Equipment
Staff should have a standard first aid kit and 5 lb ABC fire extinguisher at the site.

Emergency Decontamination
Refer to the SOP for Emergency Decontamination found in Appendix G.

Site Evacuation
The evacuation signal for the site is three short blasts of a horn, either on a motor vehicle or an air horn. Evacuation routes and assembly points are to be determined at the site. All site workers are to be notified of routes and assembly points by the SSO during the daily safety meetings. Refer to the SOP for Emergency Response found in Appendix H for more details on site evacuation.

First Aid
Refer to the SOP for Chemical First Aid found in Appendix I for general chemical first aid procedures. Standard first and CPR procedures should be used in other medical emergencies. Each first aid kit contains protection equipment that must be worn while performing first aid and CPR. This includes:

- Disposable gloves
- Disposable mouth-to-mouth resuscitator
- Safety goggles/face mask
- Disposable overgarment

Whenever first aid procedures are performed on another person, the Health and Safety Manager must be notified immediately.

J:\1252\008\04\WP\RPT\95_H&S.DOC

9

NAMES AND SIGNATURES

All Montgomery Watson employees working on or visiting this site are to sign below, indicating that they have read this Site Safety Plan (SSP), understand its contents, have been given opportunity to discuss its contents with the Site Safety Officer (SSO) and agree to abide by its requirements.

The supervisors of all subcontractors are to sign below, indicating that they have read this Site Safety Plan (SSP), understand its contents, and have been given opportunity to discuss its contents with the Site Safety Officer (SSO).

Date	Name	Employer	Signature

It is the responsibility of the Site Safety Officer (SSO) to have a completed and signed copy of this SSP returned to the project file.

CCH/vlr/SGW/MWK
J:\1252\008\04\WP\RPT\95_H&S.DOC
1252008.0409.0059-MD

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory penalties against employers of up to $1,000 for each serious violation and for optional penalties of up to $1,000 for each nonserious violation. Penalties of up to $1,000 per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $10,000 for each such violation.

There are also provisions for criminal penalties. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of up to $250,000 (or $500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State Labor or Health department or a State university.

Posting Instructions

Employers in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29,Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta	(404) 347-3573
Boston	(617) 565-7164
Chicago	(312) 353-2220
Dallas	(214) 767-4731
Denver	(303) 844-3061
Kansas	(816) 426-5861
New York	(212) 337-2325
Philadelphia	(215) 596-1201

Elizabeth Dole

Elizabeth Dole, Secretary of Labor

Washington, D.C.
1989 (Revised)
OSHA 2203

U.S. Department of Labor

A

SAFETY CHECKLISTS

SITE HEALTH AND SAFETY CHECKLIST - COMPREHENSIVE

GENERAL INFORMATION

Date:_____ Checklist completed by: _____
Project number: _____ Project name: _____
Location: _____
Site Manager: _____ Site Safety Officer: _____
Weather: [ ] windy [ ] fair [ ] cloudy [ ] dry [ ] rain [ ] sleet
[ ] snow temperature _____°C/°F

SAFETY INFORMATION

[ ]Yes [ ]No [ ]N/A	Signed SSP on-site: [ ]available [ ] posted
[ ]Yes [ ]No [ ]N/A	SSP reviewed and signed by necessary personnel.
[ ]Yes [ ]No [ ]N/A	MSDSs on site for all hazardous materials brought to site by personnel. [ ] available [ ] posted
[ ]Yes [ ]No [ ]N/A	Designated SSO present.
[ ]Yes [ ]No [ ]N/A	Site safety briefing held. Date of last briefing: __/__/
	On-site Montgomery Watson personnel meet OSHA requirements for:
[ ]Yes [ ]No [ ]N/A	• H&S training
[ ]Yes [ ]No [ ]N/A	• Medical surveillance
[ ]Yes [ ]No [ ]N/A	• Respirator fit test
	On-site Montgomery Watson subcontractors meet OSHA requirements for:
[ ]Yes [ ]No [ ]N/A	• H&S training
[ ]Yes [ ]No [ ]N/A	• Medical surveillance
[ ]Yes [ ]No [ ]N/A	• Respirator fit test
[ ]Yes [ ]No [ ]N/A	Work being done in compliance with SSP and SOPs.
[ ]Yes [ ]No [ ]N/A	Equipment specified in SSP available.
[ ]Yes [ ]No [ ]N/A	Equipment specified in SSP in working order.
[ ]Yes [ ]No [ ]N/A	Equipment manuals available.
[ ]Yes [ ]No [ ]N/A	Monitoring equipment calibrated.

[ ]Yes [ ]No [ ]N/A Calibration records available.

[ ]Yes [ ]No [ ]N/A Responsible personnel know how to operate monitoring equipment.

[ ]Yes [ ]No [ ]N/A Adequate equipment/materials inventory available.

[ ]Yes [ ]No [ ]N/A Radiation monitoring badges being worn by all personnel working with nuclear density gauges.

Zones established and enforced:

[ ]Yes [ ]No [ ]N/A • Exclusion

[ ]Yes [ ]No [ ]N/A • Decontamination

[ ]Yes [ ]No [ ]N/A • Support/clean

Proper decontamination procedures:

[ ]Yes [ ]No [ ]N/A • Set up

[ ]Yes [ ]No [ ]N/A • Enforced

[ ]Yes [ ]No [ ]N/A Emergency telephone numbers posted.

[ ]Yes [ ]No [ ]N/A Emergency route to hospital posted.

[ ]Yes [ ]No [ ]N/A Local officials notified.

[ ]Yes [ ]No [ ]N/A At least one person on-site has current first aid and CPR certification.

Appropriate first aid materials on site:

[ ]Yes [ ]No [ ]N/A • 15 minute eye wash

[ ]Yes [ ]No [ ]N/A • First aid kit

[ ]Yes [ ]No [ ]N/A Special emergency procedures implemented.

SAFETY EQUIPMENT UTILIZED BY FIELD CREW

[ ]Yes [ ]No [ ]N/A Field/Health and Safety Equipment Checklists complete and current.

COMMENTS

Effectiveness of SSP: _____

_____

_____

_____

Deficiencies noted: _____

Remedial actions required/taken: _____

HEALTH AND SAFETY MEETING ATTENDANCE

Date	Name	Employer	Signature

J:\MANUALS\SAFETY\PLANS\STDAPP.DOC

SITE HEALTH AND SAFETY CHECKLIST - DAILY

Date: _____ Checklist completed by: _____
Project number: _____ Project name: _____
Location: _____
Site Manager: _____ Site Safety Officer: _____
Weather: [ ] windy [ ] fair [ ] cloudy [ ] dry [ ] rain [ ] sleet
[ ] snow temperature: _____ ° / °

Topic covered?

[ ]Yes [ ]No [ ]N/A	Site hazards
[ ]Yes [ ]No [ ]N/A	• General site health and safety hazards
[ ]Yes [ ]No [ ]N/A	• Specific hazards associated with substances of concern
[ ]Yes [ ]No [ ]N/A	• Routes of exposure
[ ]Yes [ ]No [ ]N/A	• Specific hazards associated with a task/job
[ ]Yes [ ]No [ ]N/A	• Physical stresses/hazards
[ ]Yes [ ]No [ ]N/A	• "Buddy" system
[ ]Yes [ ]No [ ]N/A	Site Safety Plan
[ ]Yes [ ]No [ ]N/A	• Role/duties of Site Safety Officer (SSO)
[ ]Yes [ ]No [ ]N/A	• Ambient air monitoring
[ ]Yes [ ]No [ ]N/A	• Emergency procedures/hospital routes
[ ]Yes [ ]No [ ]N/A	Personal Protection
[ ]Yes [ ]No [ ]N/A	• Required PPE
[ ]Yes [ ]No [ ]N/A	• SCBA/Air-supplying respirator review
[ ]Yes [ ]No [ ]N/A	• Proper donning/doffing techniques
[ ]Yes [ ]No [ ]N/A	Decontamination
[ ]Yes [ ]No [ ]N/A	• Overview of station(s)
[ ]Yes [ ]No [ ]N/A	• Proper techniques
[ ]Yes [ ]No [ ]N/A	• Field equipment decontamination
[ ]Yes [ ]No [ ]N/A	• Heavy equipment/machinery decontamination
[ ]Yes [ ]No [ ]N/A	• Vehicle movement
[ ]Yes [ ]No [ ]N/A	• Personal hygiene

Health and Safety Meeting Attendance

Date	Name	Employer	Signature

J:\MANUALS\SAFETY\PLANS\STDAPP.DOC

EXCAVATION SAFETY CHECKLIST

(This form is to be completed daily.)

Project: _____ Project #: _____

Competent Person: _____ Date: _____

Utilities Checked

_____Telephone
_____Electric
_____Natural Gas
_____Water
_____Sewer
_____Cable TV
_____Other

Secure Surface & Overhead Structures

_____Power Poles
_____Overhead Obstacles
_____Roads
_____Buildings/Foundations
_____Sidewalks
_____Other

Trench Depth

_____0-5' _____5'-10' _____10'-15' _____15'-20' _____>20'

Egress

Ladder Present in Trench _____Yes _____No
(Ladder required at trench depths of 4' or greater)
(Ladder to extend 36" above ground surface)
(Ladder or ramp within 25' of linear travel in either direction)

Soil Classification

Visual Analysis of Soil
_____Cracks/Fissures/Spalling of Trench Sides
_____Water Seeping From Sides or Bottom
_____Different Soil in Layers
_____Soil Previously Disturbed
_____Underground Utilities Present
_____Continuous Vibration Present

Penetrometer Reading: _____

	A	B	C
Penetrometer Reading	≥ 1.5 tsf	1.5-0.5 tsf	<0.5 tsf
Not Previously Disturbed	Previously Disturbed	Previously Disturbed	
Stable Dry Rock	Cracks Fissures	Seeping Soil Wet Soil	
Maximum Slope	53 deg. (3/4:1)	45 deg. (1:1)	34 deg. (1-1/2:1)

Vehicular Traffic

Area Properly Barricaded _____Yes _____No

Reflective Clothing Warn _____Yes _____No

Flagman Present as Necessary _____Yes _____No

Protective System in Place to Prevent Vehicles Unloading Fill Materials From Backing into Excavation _____Yes _____No

Other Hazards

Check for Hazardous Atmospheres

_____Oxygen _____Combustibles _____Organic Vapors _____Other

Confined Space Permit Acquired _____Yes _____No

Excavated materials and equipment at least 2 feet from edge of excavation and no other overhead hazards to personnel in excavation _____Yes _____No

Water removed from excavation _____Yes _____No

Ramps, Walkways, Bridges over Excavations Equipped with Handrails _____Yes _____No

Shoring System Designed by Professional Engineer _____Yes _____No

Excavations Barricaded or Filled in at End of Day _____Yes _____No

B

CHEMICAL HAZARD SUMMARY INFORMATION

BENZENE

CAS #:	71-43-2	ACGIH TLV:	10 ppm
MOL. WT:	78.11	ACGIH STEL:	susp. human carcinogen
CONC IDLH:	3000 ppm	OSHA PEL:	TWA 1 ppm;
NIOSH REL:	.1 ppm		STEL 5 ppm

DESCRIPTION

Physical:	Colorless to pale yellow watery liquid with a gasoline-like odor
Odor:	gasoline-like
Odor Threshold:	4.68 ppm

CHEMICAL/PHYSICAL PROPERTIES

Boiling Point:	176 F	80 C	Vapor Pressure:	75 mm @ 20 C
Melting Point:	42 F	5.5 C	Ionization Potential:	9.25
Flash Point:	11.9 F	-11.15 C	Upper Explosion Limit:	7.1%
Solubility:	0.06%		Lower Explosion Limit:	1.3%

INCOMPATIBILITIES:

Strong ox, chlorine, bromine with iron

ROUTES OF EXPOSURE

Target Organs:	Blood, CNS, skin, bone marrow, eyes, resp sys
Health Hazards:	May be poisonous if inhaled or absorbed through skin. Vapors may cause dizziness or suffocation. Contact may irritate or burn skin and eyes. Fire may produce irritating or poisonous gases. Runoff from fire control or dilution water may cause pollution.

SYMPTOMS OF OVEREXPOSURE

Dizziness, excitation, pallor followed by flushing, weakness, headache, breathlessness, chest constriction.

FIRST AID

Move victim to fresh air and call emergency medical care. If not breathing, give artificial respiration; if breathing is difficult, give oxygen. In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water. Remove and isolate contaminated clothing and shoes at the site.

NFPA RATINGS

Health Hazard (Blue):	(2)hazardous to health; area may be entered with self-contained breathing apparatus
Flammability (Red):	(3)material can be ignited under almost all temperature conditions
Reactivity (Yellow):	(0)stable even under fire conditions
Special:	no data

PHENOL

CAS #:	108-95-2	ACGIH TLV:	5 ppm / 19 mg/M3
MOL. WT:	94.12	ACGIH STEL:	no data
CONC IDLH:	250 ppm	OSHA PEL:	5 ppm / 19 mg/M3
NIOSH REL:	5 ppm / 19 mg/M3		

DESCRIPTION

Physical: Colorless or white crystalline solid that may redden on exposure to light and heat; also sold as a liquid solution

Odor: somewhat sickening sweet and acrid

Odor Threshold: 0.05 ppm

CHEMICAL/PHYSICAL PROPERTIES

Boiling Point:	359 F	181.6 C	Vapor Pressure:	0.35 mm @ 25 C
Melting Point:	106 F	41.1 C	Ionization Potential:	13.6
Flash Point:	173.9 F	78.85 C	Upper Explosion Limit:	8.6%
Solubility:	9.3% @ 25 C		Lower Explosion Limit:	1.7%

INCOMPATIBILITIES:

Strong oxidizers, calcium hypochlorite

ROUTES OF EXPOSURE

Target Organs: pancreas, spleen, lungs, liver, kidneys, skin, eyes

Health Hazards: Poisonous; may be fatal if inhaled, swallowed or absorbed through skin.

Contact may cause burns to skin and eyes.

Fire may produce irritating or poisonous gases.

Runoff from fire control or dilution water may cause pollution.

SYMPTOMS OF OVEREXPOSURE

Will burn eyes and skin. The analgesic action may cause loss of pain sensation. Readily absorbed through skin, causing increase in heart rate, convulsions, and death.

FIRST AID

Move victim to fresh air and call emergency medical care. If not breathing, give artifical respiration; if breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with running water for at least 15 minutes. Speed in removing material from skin is of extreme importance. Remove and isolate contaminated clothing and shoes at the site. Keep victim quiet and maintain normal body temperature. Effects may be delayed; watch victim.

NFPA RATINGS

Health Hazard (Blue): (3)extremely hazardous to health; full protection required; no skin surface should be exposed

Flammability (Red): (2)material must be moderately heated before ignition will occur

Reactivity (Yellow): (0)stable even under fire conditions

Special: no data

CHROMIUM

CAS #:	7440-47-3	ACGIH TLV:	0.5 mg/M3
MOL. WT:	51.996	ACGIH STEL:	no data
CONC IDLH:	no data	OSHA PEL:	1 mg/M3
NIOSH REL:	no data		

DESCRIPTION

Physical:	Steel-gray metal or silver metal powder
Odor:	no data
Odor Threshold:	no data

CHEMICAL/PHYSICAL PROPERTIES

Boiling Point:	4787.3 F	2641.8 C	Vapor Pressure:	no data
Melting Point:	3451.7 F	1899.8	Ionization Potential:	no data
Flash Point:	no data		Upper Explosion Limit:	no data
Solubility:	no data		Lower Explosion Limit:	no data

INCOMPATIBILITIES:

Strong oxidizers

ROUTES OF EXPOSURE

Target Organs:	no data
Health Hazards:	Contact may cause burns to skin and eyes
	Fire may produce irritating or poisonous gases
	Runoff from fire control or dilution water may cause pollution

SYMPTOMS OF OVEREXPOSURE

Histologic fibrosis of lungs

FIRST AID

In case of contact, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water. Remove and isolate contaminated clothing at site.

NFPA RATINGS

Health Hazard (Blue):	no data
Flammability (Red):	no data
Reactivity (Yellow):	no data
Special:	no data

CYANIDE (inorganic)

CAS #:	57-12-5	ACGIH TLV:	5 mg/M3
MOL. WT:	no data	ACGIH STEL:	as cyanide - skin
CONC IDLH:	50 mg/M3	OSHA PEL:	5 mg/M3
NIOSH REL:	4.7 ppm / 5 mg/M3		

DESCRIPTION

Physical:	no data
Odor:	no data
Odor Threshold:	no data

CHEMICAL/PHYSICAL PROPERTIES

Boiling Point:	-412.9 F	-247.2 C	Vapor Pressure:	no data
Melting Point:	no data		Ionization Potential:	no data
Flash Point:	no data		Upper Explosion Limit:	no data
Solubility:	no data		Lower Explosion Limit:	no data

INCOMPATIBILITIES: no data

ROUTES OF EXPOSURE

Target Organs: no data

Health Hazards: Poisonous; may be fatal if inhaled, swallowed or absorbed through skin.
Contact may cause burns to skin and eyes.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

SYMPTOMS OF OVEREXPOSURE

no data

FIRST AID

Move victim to fresh air and call emergency medical care. If not breathing, give artifical respiration; if breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with running water for at least 15 minutes. Speed in removing material from skin is of extreme importance. Remove and isolate contaminated clothing and shoes at the site. Keep victim quiet and maintain normal body temperature. Effects may be delayed; watch victim.

NFPA RATINGS

Health Hazard (Blue):	no data
Flammability (Red):	no data
Reactivity (Yellow):	no data
Special:	no data

TOLUENE

CAS #:	108-88-3	ACGIH TLV:	50 ppm / 188 mg/M3
MOL. WT:	92	ACGIH STEL:	no data
CONC IDLH:	2000 ppm	OSHA PEL:	200 ppm
NIOSH REL:	100 ppm / 375 mg/M3		

DESCRIPTION

Physical:	Colorless watery liquid with a pleasant odor
Odor:	strong, pleasant
Odor Threshold:	40 ppm

CHEMICAL/PHYSICAL PROPERTIES

Boiling Point:	230.8 F	110.4 C	Vapor Pressure:	36.7 mm @ 30 C
Melting Point:	-139.3 F	-95.2 C	Ionization Potential:	8.82
Flash Point:	40 F	4.45 C	Upper Explosion Limit:	7.1%
Solubility:	0.05%		Lower Explosion Limit:	1.3%

INCOMPATIBILITIES: Strong ox

ROUTES OF EXPOSURE

Target Organs:	CNS, liver, kidneys, skin, eyes
Health Hazards:	May be poisonous if inhaled or absorbed through skin. Vapors may cause dizziness or suffocation. Contact may irritate or burn skin and eyes. Fire may produce irritating or poisonous gases. Runoff from fire control or dilution water may cause pollution.

SYMPTOMS OF OVEREXPOSURE

Vapors irritate eyes and upper respiratory tract; cause dizziness, headache, anesthesia, respiratory arrest. Liquid irritates eyes and causes drying of skin. If aspirated, causes coughing, gagging, distress, and rapidly developing pulmonary edema. If ingested causes vomiting, griping, diarrhea, depressed respiration.

FIRST AID

Move victim to fresh air and call emergency medical care. If not breathing, give artifical respiration; if breathing is difficult, give oxygen. In case of contact, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water. Remove and isolate contaminated clothing and shoes at the site.

NFPA RATINGS

Health Hazard (Blue):	(2)hazardous to health; area may be entered with self-contained breathing apparatus
Flammability (Red):	(3)material can be ignited under almost all temperature conditions
Reactivity (Yellow):	(0)stable even under fire conditions
Special:	no data

VINYL CHLORIDE

CAS #:	75-01-4	ACGIH TLV:	5 ppm
MOL. WT:	62.50	ACGIH STEL:	no data
CONC IDLH:	no data	OSHA PEL:	1 ppm
NIOSH REL:	pot. occupational carcinogen		

DESCRIPTION

Physical:	Colorless liquified compressed sag with a sweet odor
Odor:	pleasant, sweet
Odor Threshold:	260 ppm

CHEMICAL/PHYSICAL PROPERTIES

Boiling Point:	7.2 F	-13.8 C	Vapor Pressure:	2600 mm @ 25
Melting Point:	-244.8 F	-153.8 C	Ionization Potential:	7.57
Flash Point:	-110.5 F	-79.15 C	Upper Explosion Limit:	33%
Solubility:	insoluable		Lower Explosion Limit:	3.6%

INCOMPATIBILITIES: no data

ROUTES OF EXPOSURE

Target Organs:	skin, eyes, mucous membranes, nervous system, liver, kidneys
Health Hazards:	May be poisonous if inhaled. Contact may cause burns to skin and eyes. Vapors may cause dizziness or suffocation. Contact with liquid may cause frostbite. Fire may produce irritating or poisonous gases.

SYMPTOMS OF OVEREXPOSURE

Inhalation:	high concentrations cause dizziness, anesthesia, lung irritation
Skin:	may cause frostbite; phenol inhibitor may be absorbed through skin if large amounts of liquid evaporate

FIRST AID

Move victim to fresh air and call emergency medical care. If not breathing, give artifical respiration; if breathing is difficult, give oxygen. In case of frostbite, thaw frosted parts with water. Keep victim quiet and maintain normal body temperature.

NFPA RATINGS

Health Hazard (Blue):	(2)hazardous to health; area may be entered with self-contained breathing apparatus
Flammability (Red):	(4)material forms readily ignitable mixtures in air
Reactivity (Yellow):	(1)normally stable, but may become unstable at elevated temperatures and pressures
Special:	no data

XYLENE

CAS #:	1330-20-7	ACGIH TLV:	100 ppm / 435 mg/M3
MOL. WT:	106.18	ACGIH STEL:	150 ppm / 655 mg/M3
CONC IDLH:	1000 ppm	OSHA PEL:	100 ppm / 435 mg/M3
NIOSH REL:	100 ppm / 434 mg/M3		

DESCRIPTION

Physical:	Colorless liquid with aromatic odor
Odor:	like benzene; characteristic aromatic
Odor Threshold:	0.05

CHEMICAL/PHYSICAL PROPERTIES

Boiling Point:	281.9 F	138.8 C	Vapor Pressure:	6.7 mm @21 C
Melting Point:	-15.1 F	-26.2 C	Ionization Potential:	8.56
Flash Point:	80.9 F	27.2 C	Upper Explosion Limit:	7%
Solubility:	very sl sol		Lower Explosion Limit:	1%

INCOMPATIBILITIES:

Strong oxidizers

ROUTES OF EXPOSURE

Target Organs: CNS, eyes, gi tract, blood, liver, kidneys, skin

Health Hazards:
May be poisonous if swallowed or absorbed through skin.
Vapors may cause dizziness or suffocation.
Contact may cause burns to skin and eyes.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

SYMPTOMS OF OVEREXPOSURE

Dizziness, excitement, drowsiness, incoherence, staggering gait, irritated eyes, nose, throat, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermal irritation.

FIRST AID

Move victim to fresh air and call emergency medical care. If not breathing, give artifical respiration; if breathing is difficult, give oxygen. In case of contact, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water. Remove and isolate contaminated clothing and shoes at the site.

NFPA RATINGS

Health Hazard (Blue):	(2)hazardous to health; area may be entered with self-contained breathing apparatus
Flammability (Red):	(3)material can be ignited under almost all temperature conditions
Reactivity (Yellow):	(0)stable even under fire conditions
Special:	no data

HYDROGEN CYANIDE, ANHYDROUS, STABILIZED

CAS #:	74-90-8	ACGIH TLV:	no data
MOL. WT:	27.03	ACGIH STEL:	no data
CONC IDLH:	no data	OSHA PEL:	no data
NIOSH REL:	4.7 ppm / 5 mg/M3		

DESCRIPTION

Physical:	Colorless liquid with an odor of bitter almonds
Odor:	no data
Odor Threshold:	no data

CHEMICAL/PHYSICAL PROPERTIES

Boiling Point:	78.2 F	25.7 C	Vapor Pressure:	400 mm @ 9.8
Melting Point:	8.2 F	-13.2 C	Ionization Potential:	no data
Flash Point:	-459.7 F	-273.15 C	Upper Explosion Limit:	40%
Solubility:	miscible		Lower Explosion Limit:	5.6%

INCOMPATIBILITIES: no data

ROUTES OF EXPOSURE

Target Organs: no data

Health Hazards: Poison; extremely hazardous. May be fatal if inhaled or absorbed through skin.

Initial odor may be irritating, foul or absent and may deaden your sense of smell.

Runoff from fire control or dilution water may cause pollution.

SYMPTOMS OF OVEREXPOSURE

no data

FIRST AID

Move victim to fresh air and call emergency medical care. If not breathing, give artifical respiration; if breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with running water for at least 15 minutes. Keep victim quiet and maintain normal body temperature. Effects may be delayed; watch victim.

NFPA RATINGS

Health Hazard (Blue):	no data
Flammability (Red):	no data
Reactivity (Yellow):	no data
Special:	no data

C

SITE MAPS

ILLINOIS

QUADRANGLE LOCATION

NOTE

BASE MAP DEVELOPED FROM THE NAPERVILLE, ILLINOIS, 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP, DATED 1993.

north

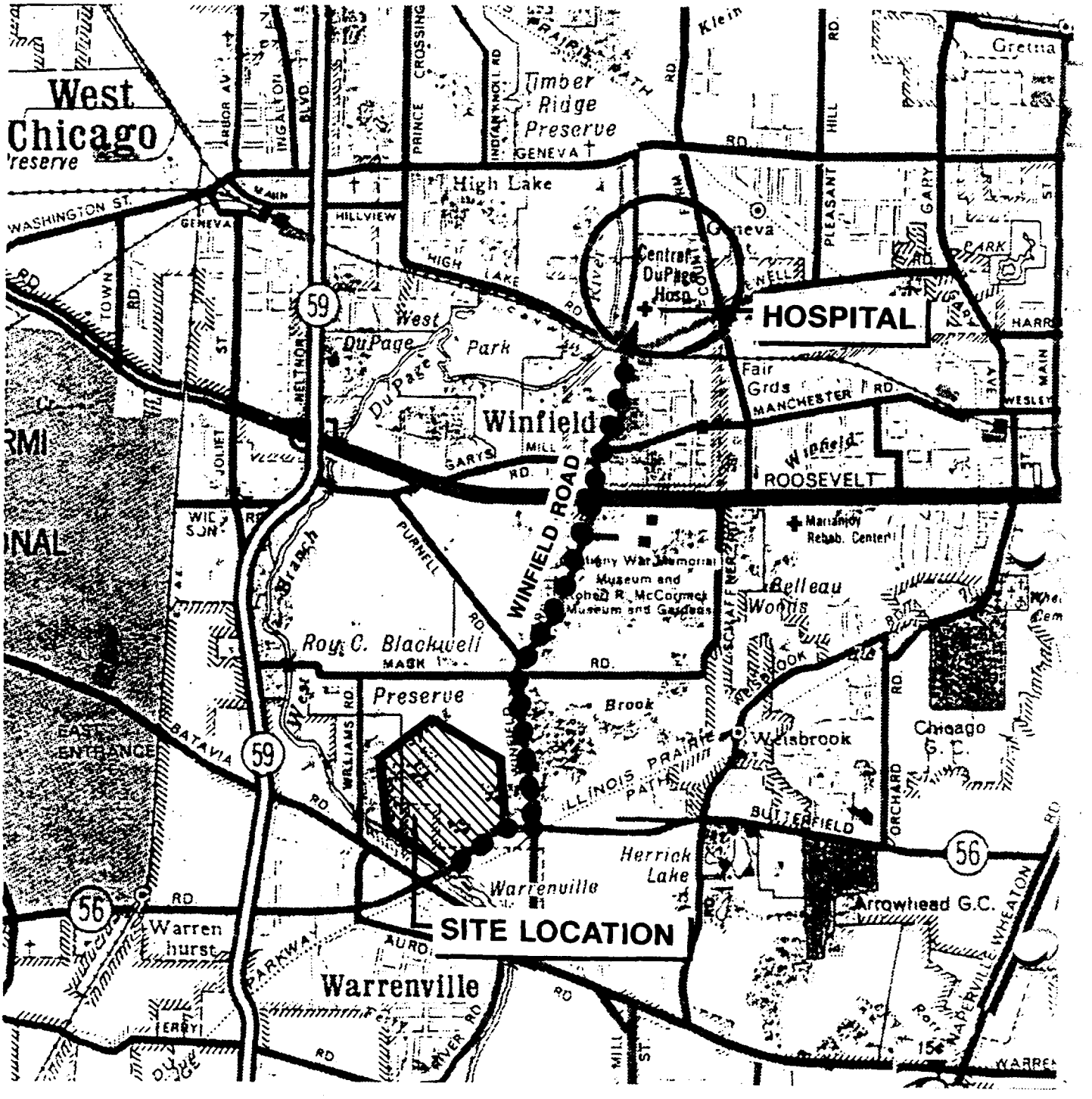
0 2000 4000

SCALE IN FEET

Developed By DRF	Drawn By DLF	**SITE LOCATION MAP**	Drawing Number 3920.0014 **A2**
Approved By T. Karwoski	Date 4-19-96	RESPONSE ACTIONS BLACKWELL LANDFILL SITE DU PAGE COUNTY, ILLINOIS	**MONTGOMERY WATSON**
Reference			
Revisions			

QUALITY CONTROL | Graphic Standards DLF 4-1-96 | Lead Professional DRF 4-1-96 | Technical Review TJK 4-2-96 | Project Manager | Management Review | Other

QUALITY CONTROL	Graphic Standards DLF 4-1-96	Technical Review	Management Review
	Lead Professional SGW 4-2-96	Project Manager TJK 4-2-96	Other



NOTE

BASE MAP DEVELOPED FROM RAND-McNALLY CHICAGOLAND MAP, DATED 1991.

north

0 1 2

SCALE IN MILES

Developed By SGW	Drawn By LCL	**HOSPITAL ROUTE MAP**	Drawing Number 3920.0014 A1
Approved By T. Kanouk	Date 4-19-96	PRE-DESIGN INVESTIGATION ACTIVITIES BLACKWELL LANDFILL NPL SITE DU PAGE COUNTY, ILLINOIS	MONTGOMERY WATSON
Reference			
Revisions			

D

SEVERE WEATHER

D

SEVERE WEATHER

When projects are conducted outside, the potential for severe weather must be considered. Thunderstorms, tornados, and winter storms can develop quickly, jeopardizing your safety. The following emergency procedures are to be followed in the event of severe weather.

THUNDERSTORMS AND LIGHTNING

Monitor weather conditions at all times while working. At a sign of an impending storm - increased cloudiness, darkened skies, increased wind - listen to a radio for the latest weather information.

When a thunderstorm accompanied by lightning is in the project area, cease work immediately. All powered equipment, such as drill rigs, are to be shut down.

Seek shelter inside nearby buildings or trailers. If there are no buildings nearby, seek shelter inside your vehicle.

If you are caught outside, do not stand beneath tall, isolated trees or telephone poles. Avoid areas projecting above the landscape such as hill tops. In open areas, go to a low place such as a ravine or valley. Stay away from open water, metal equipment, wire fences and metal pipes. If you are in a group of people in the open, spread out, staying several yards apart.

If you are caught in a level field or open area far from shelter and you feel your hair stand on end, lightning may be about to strike you. Drop to your knees and bend forward, putting your hands on your knees. You should minimize the body area in direct contact with the ground. Do not lie flat on the ground.

If someone has been struck by lightning, monitor life signs and begin administering mouth-to-mouth resuscitation or cardiopulmonary resuscitation as needed. Send for help.

Check conscious victims for burns, especially at the fingers and toes and next to buckles and jewelry. Administer first aid for shock. Do not let the victim walk around.

TORNADOS

Tornados usually develop from thunderstorms and normally occur at the trailing edge of the storm. Most tornados occur in the months of April, May, June, and July in the late afternoon and early evening hours.

When storms are predicted for the project area, monitor weather conditions on a radio. A tornado watch is issued when favorable conditions exist for the development of a tornado. A tornado warning is issued by the local weather service office whenever a tornado has actually been sighted or is strongly indicated by radar.

If a tornado warning is issued, seek shelter immediately. If there are permanent buildings located on site, go there immediately, moving toward interior hallways or small rooms on the lowest floor.

If a tornado warning is issued and you are in a vehicle or a site trailer, leave and go to the nearest building. If there are no buildings nearby, go in the nearest ditch, ravine or culvert, with your hands shielding your head.

If a tornado is sighted or a warning issued while you are in open country, lie flat in a ditch or depression. Hold onto something on the ground, such as a bush or wooden fence post, if possible.

Once a tornado has passed the site, site personnel are to assemble at the designated assembly area to determine if anyone is missing. Administer first aid and seek medical attention as needed.

WINTER STORMS

When snow or ice storms are predicted for the project area, site personnel should monitor weather conditions on a radio. A winter storm watch is issued when a storm has formed and is approaching the area. A winter storm warning is issued when a storm is imminent and immediate action is to be taken.

When a storm watch is issued, monitor weather conditions and prepare to halt site activities. Notify the project manager of the situation. Seek shelter at site buildings or leave the site and seek warm shelter.

If you are caught in a severe winter storm while traveling, seek warm shelter if road conditions prevent safe travel.

If you are stranded in a vehicle during a winter storm:

- Stay in the vehicle. Disorientation comes quickly in blowing and drifting snow.
- Wait for help.
- Keep a window open an inch or so to avoid carbon monoxide poisoning.
- Run the engine and heater sparingly.
- Keep watch - do not let everyone sleep at the same time.
- Exercise occasionally.

J:\MANUALS\SAFETY\PLANS\STDAPP.DOC

E

TEMPERATURE STRESS

E

TEMPERATURE STRESS

This section outlines the signs and symptoms of temperature stress in addition to the engineering controls, work practice controls and other management techniques that should be used to reduce temperature stress. Individual susceptibilities to temperature stress need to be considered and used to pace the work being performed with the most susceptible person controlling the work/rest schedule. Monitoring for heat stress is to be performed as detailed in this section.

COLD STRESS

Reduction

The following engineering controls are recommended for reduction of cold stress:

- Use general or spot heating to increase temperature at work site if this does not create a hazardous situation.
- Shield work area from wind.
- Cover metal handles of tools and equipment with thermal insulating materials.
- Do not sit on unprotected metal chair seats.
- Use heated rest areas if work is to be performed in an equivalent chill temperature of 20^{0} F or below.

The following work practice controls are recommended to reduce cold stress:

- Drink warm, caffeine-free, sweet, non-alcoholic drinks or soup frequently.
- Schedule work for warmest part of the day.
- Use heated rest areas regularly.

- Use the buddy system. Do not work alone. Observe your co-workers for signs and symptoms of cold stress.

- Allow and encourage workers to pace themselves and take extra breaks when needed. The work schedule should be set by the person most susceptible to cold stress. Do not pressure someone to work beyond their capabilities.

- Whenever possible, allow new workers time to adjust to working in a cold environment before working full time. Ideally, acclimation should occur over five days: 20% Day 1 with a 20% increase on each successive day.

- When possible, arrange the work to minimize standing or sitting still for long periods of time.

- Reorganize work procedures so as much of a job as possible can be done in a warm environment.

- Avoid overtime.

- Remove outer layer of clothing when entering warm shelter.

- If clothes are wet, change to dry work clothes before returning to work in cold. If not possible, loosen clothing to facilitate evaporation of sweat.

- Develop and adhere to a work-rest schedule, using the guidelines which follow.

Air Temperature with Sunny Sky (degrees F)	Work/Break Schedule (minutes)				
	no wind	5 mph wind	10 mph wind	15 mph wind	20 mph wind
-15 to -19	110/10	110/10	75/10	55/10	40/10
-20 to -24	110/10	75/10	55/10	40/10	30/10
-25 to -29	75/10	55/10	40/10	30/10	cease
-30 to -34	55/10	40/10	30/10	cease	cease
-35 to -39	40/10	30/10	cease	cease	cease
-40 to -44	30/10	cease	cease	cease	cease
-45 & below	cease	cease	cease	cease	cease

Notes

1. These recommendations and guidelines are adapted from Threshold Limit Values and Biological Exposure Indices for 1993-1994, published by the American Conference of Governmental Industrial Hygienists, Cincinnati, OH.

2. 05 mph wind - light flag moves, 10 mph wind - light flag fully extended, 15 mph wind - raises newspaper sheet, 20 mph wind - blowing and drifting snow

The practicality of working under a work-rest schedule, together with the ability of the necessary equipment to function properly in cold weather, may be more restrictive than the health hazards and also need to be considered. The cold stress schedules noted above apply to moderate to heavy work activities. Light to moderate work activities can be moved down one level.

Signs and Symptoms
Send a worker to warm shelter immediately if any of the following symptoms are noted:

- Heavy shivering
- Frostnip (skin turns white)
- Feeling of excessive fatigue
- Drowsiness
- Euphoria

First Aid
Take victim to a warm area. Remove the outer layers of clothing. Gently warm the affected area, submerge it in tepid water if possible but do not rub. If there is evidence of frostbite, obtain medical attention immediately.

HEAT STRESS

Reduction
While site specific conditions need to be considered, the following guidelines are recommended to prevent or reduce the effects of heat stress.

- Develop and adhere to a work-rest schedule using the guidelines at the end of this section.

- Take breaks in cool areas.

- Drink fluids hourly. The fluids should be caffeine-free and non-alcoholic. Water or electrolyte-replacement drinks, such as Gatorade™, are good choices. Do not wait until you are thirsty. Your normal thirst mechanism is not sufficient to overcome the effects of dehydration. If you feel thirsty, you are already becoming dehydrated.

- Schedule work for the cooler part of the day -- early morning and/or early evening.

- Allow and encourage workers to pace themselves and take extra breaks when needed. The work schedule should be set by the person most susceptible to heat stress. Do not pressure someone to work beyond their capabilities.

- Whenever possible, allow new workers time to adjust to working in a hot environment before working full time. Ideally, acclimation should occur over five days: 20% Day 1 with a 20% increase on each successive day.

- Avoid overtime.

- Use the buddy system. Never work alone and watch your co-workers for signs of heat stress.

Personal Monitoring

At each work break, count your pulse during a 30 second period as early as possible in the rest period.

- If your heart rates exceeds 110 beats per minute (BPM) at beginning of rest period, shorten your next work cycle by 1/3 and keep the rest period the same.

- If your heart rate still exceeds 110 BPM at that next rest period, shorten the following work cycle by 1/3.

At the beginning and end of each work shift, measure your weight, $\pm$0.25 LB, wearing similar clothes. You should not lose more than 1.5 % of your total body weight in a work day. If you do, drink fluids to compensate and to prevent dehydration.

A summary of recommended work breaks and personal monitoring schedule follows. These values apply to moderate work levels. For heavy work levels, apply monitoring schedule one level up. Light to sedentary work activities can be moved down one level if workers are acclimated and show no signs of heat stress.

		Heat Stress Monitoring (min)	
Adjusted Temperature*		**Normal Work**	**Impermeable Work**
	(°)	**Clothes**	**Clothes**
above 90	45	15	
88 to 90	60	30	
83 to 87	90	60	
77 to 82	120	90	
72 to 78	150	120	

* Adjusted temperature = measured temperature + (13 x % sunshine)

Note

1. These recommendations and guidelines are adapted from Threshold Limit Values and Biological Exposure Indices for 1990-1991, published by the American Conference of Governmental Industrial Hygienists, Cincinnati, OH.

Signs and Symptoms

- Heat rash
- Heat cramps: Muscle spasms; pain in hands, feet or abdomen
- Heat exhaustion: Pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting
- Heat stroke: Red, hot, usually dry skin; lack of, or reduced, perspiration; nausea; dizziness; confusion; strong, rapid pulse; coma

First Aid

Remove the affected individual's protective clothing and equipment. Wrap the victim in wet towels or clothing. If there are signs or symptoms of heat exhaustion or heat stroke, get medical attention immediately.

J:\MANUALS\SAFETY\PLANS\STDAPP.DOC

F

General Health and Safety Rules

F

GENERAL HEALTH AND SAFETY RULES

Certain rules and regulations apply to specific Montgomery Watson Operations. Personnel will follow these procedures when performing the specified tasks or work in the designated area.

SAFETY RULES WHEN WORKING NEAR HIGHWAYS OR CONSTRUCTION SITE TRAFFIC

Set out traffic cones, warning signs, and flashers when performing field work in traffic areas. In traffic areas and on construction sites where heavy equipment is operating, wear luminous traffic vests.

Wear safety vests when working closer than 10 ft from a roadway.

Use safety signs when performing bridge and highway surveys and use warning lights on vehicles, as appropriate.

Let the construction equipment operators know you are around. Have "eye to eye" contact prior to setting up for a test.

Check the traffic pattern on construction projects before entering with a Montgomery Watson vehicle.

Stay away from the swing of the back-hoe bucket.

If practical, use your vehicle on a large site to divert construction traffic around the test area.

Park the testing vehicle between your work area and the operating equipment. Always work a significant distance behind your vehicle to allow for it being struck.

SAFETY RULES FOR HAZARDOUS WASTE SITES

Smoking is not permitted at the site or in the site trailer.

Eating and drinking are only permitted in the support or clean zone.

Secure all loose equipment in the test vehicle which might "fly" when making sudden stops.

No open fires are allowed.

All employees handling hazardous waste samples or who may be exposed to hazardous or solid waste must be active participants in the medical surveillance program.

A respirator can not be worn when beards or any other facial hair interferes with the face-to-respirator seal. Individuals with such facial hair are not to be allowed to work in Level of Protection C or B.

Working alone on field sites is generally prohibited. The "buddy system" is to be enforced at all times unless the Health and Safety Coordinator (HSC) specifically exempts the work from his requirement, based on the HSC's review of site conditions and hazards. When working under the "buddy system", personnel are to:

- Never work alone
- Provide partner with assistance
- Observe partner for signs for overexposure/temperature stress
- Check integrity of partner's protection clothing
- Notify others if emergency help is needed

Personnel on site must use the buddy system when wearing respiratory protective equipment. Visual contact must be maintained between pairs on-site. Entry team members are to remain close together to assist each other during emergencies.

No "souvenirs" or samples not required for the project are to be collected.

Samples are to be placed in approved containers before they can be removed from the site. Only approved or designated vehicles can be used to transport samples.

Samples are to be left in the staging area. Samples are never to be brought into the office.

Field apparel that had not been decontaminated is not to be worn into the office.

Field samples are to be disposed properly.

Observe all safety signs and do not remove any "lockout tags" or other lockout devices.

Contact with contaminated or suspected contaminated surfaces is to be avoided.

Do not walk through puddles, discolored surface, kneel on the ground, or lean, sit, or place equipment on visibly stained surfaces.

Drums or tanks found on site are not to be opened or moved unless specific drum/tank remediation tasks are specifically included in the SSP and are fully implemented.

Use work schedules that minimize time spent in hazardous areas.

Use work assignments that place employees upwind of sources of air contaminants.

Post the Site Safety Plan, or have a copy readily available, for review by employees. Verify that all personnel have read and signed the SSP.

Notify the SSO of any unsafe acts or conditions or at the first indication that you experience temperature stress or signs and symptoms of possible chemical exposure.

LADDER SAFETY

Ladders pose a significant hazard when improperly used or maintained. There are four causes of accidents involving ladders. They include:

- Improperly securing ladder top and/or bottom
- Structural failure of ladders
- Ascending or descending ladders improperly
- Carrying objectives when ascending or descending ladders

Step Ladders

Step ladders must have positive locking spreaders which will fully spread and lock when the ladder is in use.

- Do not use a step ladder as a straight ladder.
- Do not use the top two steps of a step ladder.
- Do not climb the cross-bracing on the rear side of stepladders.

Straight Ladders

Portable manufactured straight ladders will be used by Montgomery Watson. Job-built ladders require special regulations and will not be used by Montgomery Watson employees unless approval is given by the Health and Safety Manager.

- When portable ladders are used for access to an upper landing surface, the side rails must extend at least 3 feet above the upper landing surface. The ladder must be secured, and a grasping device, such as a grab rail, must be provided to assist workers in mounting and dismounting the ladder.

- Ladders must be maintained free of oil, grease, and other slipping hazards.

- Ladders must not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity.

- Ladders must be used only for the purpose for which they were designed.

- Non-self-supporting ladders must be used at an angle where the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder.

- Ladders must be used only on stable and level surfaces unless secured to prevent accidental movement.

- Ladders must not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Slip-resistant feet must not be used as a substitute for the care in placing, lashing, or holding a ladder upon slippery surfaces.

- Ladders placed in areas such as passageways, doorways or driveways, or where they can be displaced by workplace activities or traffic, must be secured to prevent accidental movement, or a barricade must be used to keep traffic or activities away from the ladder.

- The area around the top and bottom of the ladders must be kept clear.

- Ladders must not be moved, shifted, or extended while in use.

- Ladders must have nonconductive siderails if they are used where the worker or the ladder could contact exposed energized electrical equipment.

- Ladders must be inspected by a competent person for visible defects on a periodic basis and after any incident that could affect their safe use.

- Single-rail ladders must not be used.

- When ascending or descending a ladder, the worker must face the ladder.

- Each worker must use at least one hand to grasp the ladder when moving up or down the ladder.

- A worker on a ladder must not carry any object or load that could cause the worker to loose balance and fall.

Other Procedures

- Don't reach beyond a normal arm's length sideways when working on a ladder. A good rule of thumb is to "keep your belt buckle between the side rails." Move the ladder as often as necessary to get close to the work.

- When extending extension ladders, keep your hands on the rails, not the rungs to prevent injuring your hands. Be sure the interlocking guides and connecting mechanisms are set and securely latched.

- Tools should not be left hanging or dangling from ladders or ladder rungs.

FALL PROTECTION

OSHA requires fall protection when the distance from a working surface to a lower level is more than six (6) feet. Fall protection may be required for distances less than six (6) feet if there are obstructions or other hazards present. The Montgomery Watson Site Safety Officer will be responsible for implementing fall protection procedures during field activities.

A fall protection system consists of four components - an anchorage point, a lanyard, a body support, and associated connectors.

Anchorage Point

Anchorage points for fall protection systems must be able to withstand 5,400 lbs static load strength for a 6 ft fall or 3,000 lbs for a 2 ft or less fall. The anchorage point should be directly overhead of the worker to prevent horizontal swing in the event of a fall.

A horizontal lifeline is a cable rigged between two fixed anchorage points on the same level and independent of the work surface. Horizontal lifelines are used when there are no anchorage points above the work area. A horizontal lifeline system requires careful engineering and will not be used without authorization of the Montgomery Watson Health and Safety Manager.

Lanyards
A lanyard is a short, flexible rope, or strap webbing used to connect a worker's safety harness to the anchorage point. Lanyards should have a minimum strength of 5,000 lbs and absorb the shock of a free fall of 6 ft or less. Shock absorbing lanyards are also available that absorb the energy of a free fall and decelerate the fall of the worker.

It is Montgomery Watson policy to purchase manufactured lanyards. Home made lanyards or ropes and tire-offs not allowed.

When attaching a lanyard to an anchorage point special crossover straps, or tie off adapters will be used. These are webbed straps with a D-ring on each end: The strap is looped around a pipe, beam or other anchor and the lanyard in anchored into both D-rings. Looping a lanyard around the anchor and hooking back onto itself is not permitted.

Self-Retracting Lifelines
Self-retracting lifelines are portable devices which are fixed to an anchorage point above a work area and plays out or retracts line automatically as workers move away and toward the device. When a fall occurs, a locking device automatically arrests movement. This type of device should be used in conjunction with tripod/winch devices during confined space entry.

Body Harness
A body harness is a web belt system designed to spread the shock from a fall over the entire body. A full body harness is required for all Montgomery Watson operations requiring fall protection systems. A body belt which is worn around the waist and chest harnesses are not permitted.

Hardware Connectors
Hardware connectors consist of D-rings, snap-hooks and metal links used to connect fall protection systems together. Connectors should be corrosion-resistant and all surfaces and edges should be smooth to prevent damage to interfacing parts. D-rings and snap-hooks should be able to withstand 5,000 lbs static loads and 3,600 proof tested pounds without cracking, breaking or sustaining distortion.

Montgomery Watson policy is to only use snap-hooks with a positive locking device or spring loaded keeper which prevents "roll-out" or unintentional release of components.

Additional Requirements
Lifelines, lanyards and harnesses should be protected from sharp edges or cutting edges such as along the edge of "I" beams. A webbing material should be used in these cases.

Knots reduce the strength of ropes, lanyards and cable by as much as 50%. Standard manufactured components will be used and employees will not use knots in fall protection systems.

A lanyard should not be connected to a harness and a deceleration device such as a retractable lifeline since the maximum fall distance of 6 ft maybe exceeded.

When work is performed in an aerial lift device such as a "cherry picker", workers must wear a harness and lanyard. The lanyard should be attached to the lift device bucket. Never attach the lanyard to anything outside the bucket.

Safety belts, lanyards and lifelines must only be used for employee protection. They are never to be used for lifting static loads.

Once used to arrest a fall, the fall protection equipment must be taken out of service and destroyed unless the equipment is inspected by the Site Safety Officer and deemed safe for reuse. Lanyards will always be destroyed after use. The SSO will document that the equipment was inspected and deemed safe for reuse in the field loghook.

Maintenance

Wipe off surfaces of fall protection lanyards, harnesses and connectors to remove gross contamination. Materials can be cleaned with soap and water. A soft brush can be used to scrub the equipment. Hang freely to dry. Do not use solvents or abrasive materials to clean the equipment.

Inspections

The SSO will inspect fall protection equipment each day before use. Document the inspection in field log books.

- Check lanyards for knots, cuts, fraying, chemical degradation. Rotate the lanyard and check the entire surface for damage. Make sure spliced connections are tight and secure.

- Inspect harness for damage including cuts, fraying, and chemical degradation. Make sure buckles and rings are not damaged.

- Inspect hooks for corrosion, dirt, and physical damage. All snap-hooks must fully close and lock. Visually check and physically test the hook. Do not rely on the sound of the hook closing.

- Inspect the tripod for damage. The unit should stand firmly when legs are extended. All bolts should be tight. Winch attachment bolts should be tight. Legs should not be bent and foot pads should be in place. Check winch to make sure ratchet system functions when crank is turned. Pull the line from the winch and make sure brake mechanism works properly.

- All broken, damaged or questionable lifelines, lanyards, harnesses and hooks should be taken out of service and be replaced.

Contact the Office Supervisor, Warehouse Coordinator or Health and Safety Manager if defective parts are found, Do Not Use Damaged Equipment.

NUCLEAR DENSITY GAUGE SAFETY

Personnel who use nuclear density gauges (Troxler gauge) must follow specific procedures and regulations as required by Montgomery Watson's nuclear material license and the Nuclear Regulatory Commission (NRC). Gauges will be used, transported and stored according to these regulations.

The Troxler Nuclear Density Gauges emit two types of radiation which is a hazard for those working with the gauges.

Gamma Radiation

Gamma radiation is a form of electromagnetic radiation, as are x-rays, radio waves, and visible light. Gamma rays have no mass, zero electrical charge, travel at the speed of light and are much more energetic and penetrating than visible light. The more penetrating gamma rays are able to pass through solids. Gamma rays originate from the product nucleus after radioactive decay and are characteristic of a particular disintegration scheme. The gamma ray emitted after the decay of Cesium-137 to Barium-137 in the Troxler gauges can be stopped by several inches of lead.

Neutron Radiation

Neutron radiation used by Troxler gauges is produced by bombarding beryllium with the alpha particles produced by the decay of Americium-241. The interaction of an alpha particle with a beryllium atom produces an unstable isotope of carbon. The natural decay process that allows the carbon atom to reach a stable state requires the release of a neutron from the carbon nucleus.

The neutron, having no electrical charge, is very penetrating. The problem of shielding against neutrons is twofold: first they must be slowed down, then another material must be used to absorb the slowed neutrons. This slowing process, called thermalization, is best achieved by particles of the same mass as the neutron such as hydrogen. Water as well as other materials with high hydrogen content are ideal thermalizers. Boron and cadmium are particularly good thermal neutron absorbers. Therefore, shielding is accomplished by placing polyethylene, a material with a high hydrogen content, around the neutron source to thermalize the neutrons, allowing them to be absorbed by a thin cadmium sheet covering the polyethylene.

Exposure Limits

Current OSHA allowable exposure limits are 5 rem/year - whole body. The NRC requires that the dose to an embryo fetus during an entire pregnancy be less than 0.5 rem. Women who use nuclear density gauges should declare their pregnancy to the Radiation Safety Officer (RSO) at the earliest possible date so that this exposure limit is not exceeded.

Staff certified to use the Troxler gauges will be issued radiation badges monthly. Montgomery Watson radiation badges measure gamma rays, beta particles, x rays and fast neutrons. Personnel who are not issued radiation badges will not be allowed to use the gauges. Landauer reports of radiation exposure are in millirems. 5,000 millirems = 5 rem annual exposure limit. Each quarter personnel with radiation badges will be given a copy of their exposure record.

PRINCIPLES OF RADIATION PROTECTION

There are three factors that effect radiation exposure:

- Time - The less time a person remains in the area of radiation the less radiation dose received.
- Distance - The intensity of radiation falls off as the inverse square of the distance from the source. By moving twice as far from the source, exposure to radiation is reduced to 1/4 the level. Moving three times as far away reduces exposure to 1/9 the level.
- Shielding - Protective material placed between the user and the source reduces exposure. In the gauges, this is accomplished by keeping the sources in the "locked" or shielded position when not in use.

General Procedures

- Never use or manipulate a gauge without proper training, knowledge, or authorization.
- Wear a radiation badge when working with a gauge.
- Advise other workers to stay clear when the gauge is in use.
- Only the manufacturer should attempt to repair the source, source holder, or shutter.
- Always lock the shutter in the "off" position until maintenance is completed.
- Avoid any physical contact with, or direct exposure to the source when performing maintenance.
- Clean the gauge once or twice a week to prevent dirt form getting near the shutter.
- If necessary, clean the area around the shutter throughout the day if conditions are extremely muddy.

- Make sure the gauges are leak tested every six months.
- Before storing, make sure the source is in the safe position.
- Lock the source and shutter in place.
- Never modify the source holder, shielding, or safety interlocks.
- Store the gauge in its case when not in use.
- Never leave the gauge unattended at a job site.
- Identify the case in case it is lost, damaged or misplaced.
- Lock the area where the gauge is stored.
- When taking a gauge to and from a job site, place it in its case and keep it in an unoccupied part of the vehicle. The case should be locked and chained to the vehicle. The chain should be locked as well.
- Ship according to DOT requirements.

WORKING NEAR WATER

Employees working near water, where a danger of drowning exists will wear U.S. Coast Guard approved life jackets. The SSO will inspect life jackets before and after each use. Defective life jackets will be taken out of service and destroyed. When working from boats or barges ring buoys with at least 90 ft of line will be available for emergency use. A lifesaving skiff will be available when working from barges for rescue purposes.

ELECTRICAL SAFETY

Montgomery Watson employees will not perform electrical installations or work on energized electrical equipment where "live" parts are exposed. Energized electrical equipment should be deenergized before performing maintenance.

Electrical Cords

Electrical cords passing through work areas should be covered or elevated to protect the cord from damage and reduce hazards to employees.

Extension cords used with portable tools will be 3-wire type and will be protected from damage when in use. Extension cords must be inspected on a routine basis. Cords with cuts in the insulation or that are worn or frayed or have insulation pulled back from the plug or receptacle fittings will be taken out of service immediately.

Grounding
Portable tools and other electrical equipment will be grounded or double insulated. Ground fault circuit interrupters (GFCIs) will be used in wet areas and on all field sites and outdoor operations. Extension cords used on field sites must always be used in conjunction with GFCIs.

HOT WORK

Hot work involves the use open flames or other sources of heat around possible sources of flammable vapors. Hot work includes:

- Welding
- Burning or cutting with a torch or saw
- Grinding
- Using impact tools that create sparks
- Any other operation that is a potential ignition source in the presence of flammable vapors

These procedures are designed to control sources of ignition and reduce fire and/or explosion hazards of the operations.

Operations defined as hot work outlined above are not allowed unless they are expressly addressed under the scope of work in the health and safety plan. When hot work procedures are permitted under the scope of work, the SSO will be responsible for implementing fire control measures, they include:

- Designating a fire watcher to monitor hot work practices.
    - The fire watcher will monitor operations and have a fire extinguisher at the ready for emergencies. The fire watcher will know how to sound an alarm and how to evacuate the area.
    - Fire watchers cannot perform other tasks during hot work procedures.
    - Fire watchers should only try to extinguish fires that are within their capacity.

- Fire watches should be maintained for at least one-half hour after a welding or cutting operations to detect and extinguish smoldering fires.

- Having the right type and size of fire extinguisher for the job in question.

- Using air monitoring equipment including combustible gas indicators and oxygen monitors to maintain explosive vapors at safe levels.

- Using necessary purging/inerting procedures to reduce accumulation of flammable vapors.

UNDERGROUND STORAGE TANK (UST) REMOVAL

The following general procedure will be used for UST removal.

Initial Preparation

- Roads in the work area should be barricaded and caution tape or portable fencing used to limit access to the work area.

- Ignition sources will be removed from the work area. These include smoking, welding, all electrical equipment and internal combustion engines.

- A fire extinguisher of adequate type and size for the operation will be placed within 20 ft of operations.

Product lines should be disconnected and drained and pumps and electrical equipment removed and disconnected. The top of the tank should then be excavated. Tank contents will be removed by pumping with an explosion proof mechanical or pneumatic pump. Product will be placed in 55 gallon drums. The pump lines and hoses should be bonded to the UST and to the 55 gallon drum to prevent build-up of static charges.

Inerting/Purging

One the tanks are empty of free product, they will be inerted by placing dry ice through a fill pipe opening or by pumping nitrogen to the bottom of the tank. At least 1.5 pounds of dry ice per 100 gallons tank capacity is required. The dry ice should be crushed and evenly distributed (as much as possible) to promote rapid evaporation. As carbon dioxide or nitrogen displaces tank vapors, toxic vapors will be expelled through the vent. All other openings should be sealed to prevent air from entering the tank. Vapors should be vented 12 ft above grade by extending the vent pipe. An organic vapor monitor will be used to measure toxic vapor concentrations in the breathing zone of workers in the area. Oxygen and combustible gases will be monitored during the inerting process. When the oxygen level is less than 5%, the tanks will be excavated and staged for cleaning. (LEL readings will not

be reliable when the tank is inerted due to insufficient oxygen for combustion.) Oxygen and LEL should be monitored frequently during all operations to ensure inert conditions are maintained. When taking readings, drop a tube connected to the LEL/Oxygen meter into the tank and measure levels at the bottom, middle and upper tank levels.

An alternative method of purging involves placing an eductor-type air blower driven by an air compressor on the fill (drop) pipe to draw fresh air in through another tank opening. The blower must be installed on the drop pipe so vapors are removed from the bottom of the tank. Fresh air is drawn into the top of the tank at the other opening. The blower must be properly bonded to the tank and grounded to prevent the build-up of static charge.

Cutting

To prepare for opening the tanks, each tank will be grounded by attaching conductive cable to the tank. The other end of the cable will be attached to a grounding rod driven into the ground. An abrasive chop saw or pneumatically driven rivet buster will be used to cut off both ends of the tanks. If the rivet buster is used, two operators are required to man the device. In addition, a fire spotter with the fire extinguisher at the ready is required until the tank cutting operation is completed. For smaller tanks, under 1,000 gallons, the entire end of the tank will be removed creating a square whose corners reach the edge of the tank. For larger tanks the opening must be at least 4 ft by 4 ft to prevent the tanks from being classified as a confined space. Monitor oxygen and LEL levels throughout the process to ensure inert or purged conditions are maintained. Add more dry ice or keep pumping nitrogen into the tank during cutting. If the eductor blower method of purging is used, the blower should be run continuously through the cutting operation.

Cleaning

Once the ends of the tanks are removed, thus eliminating the tank as being classified as a confined space, personnel may enter to perform cleaning operations. Oxygen, LEL and organic vapors must be monitored before entry. If the tank was inerted with dry ice or nitrogen, the eductor blower will now be placed on the tank to purge these gases and bring oxygen levels to the acceptable range. Personnel will don Level C or Level B protection and clean the tank. Level C is used for fuel oils or diesel fuel. Level B is required when entering any tank that contained gasoline due to the possible presence of tetraethyl lead. The eductor blower will be in operation at all times during the cleaning process.

LIFTING/MATERIALS HANDLING

Back injuries are a primary workplace safety problem. Common sense and preplanning can prevent most back injuries.

Material Handling

- Inspect materials for silvers, jagged or sharp edges, burrs, rough or slippery surfaces.
- Grasp the object with a firm grip.

- Keep fingers from pinch and shear points, especially when setting materials down.
- Wipe off greasy, wet, slippery, or dirty objects before handling them.
- Keep hands free form oil and grease.
- Use leather or cloth gloves to protect hands.

Preparation For Lifting and Carrying

Before starting to lift or carry anything, check your entire walkway to make sure your footing will be solid. Your shoes should give you good balance, support and traction.

- Clear any moveable obstacles out of the way, and make sure you know the location of immovable ones.

- Cautiously heft the object to be moved to check its weight and center of gravity.

Lifting Procedure

- Get a firm footing. Keep your feet apart for a stable base; point toes out.

- Bend your knees. Don't bend at the waist. Keep the principals of leverage in mind. Don't do more work than you have to.

- Tighten you stomach muscles. Abdominal muscles support the spine offsetting the force of the load.

- Lift your legs. Let your powerful leg muscles do the work of lifting, not your weaker back muscles.

- Keep the load close. Don't hold the load away form your body. The closer it is to your spine, the less force it exerts on you back.

- Keep your back upright. Whether lifting or putting down the load; don't add the weight of your body to the load.

Safety Tips for Lifting

- Don't lift objects over your head.
- Don't twist your body when lifting or setting an object down.
- Don't reach over an obstacle to lift a load. Move the obstacle or go around it.
- Pace yourself to avoid fatigue when doing heavy work for long periods.
- Use common sense.

Alternative To Lifting

For difficult lifting tasks, keep the following in mind.

- Ask a co-worker for help.

- Use a cart or other material handling device.

Pushing a load is easier on the back than pulling it. When pushing a load:

- Stay close to the load.
- Don't lean forward.
- Use both arms.
- Keep the stomach muscles tight.

If you must pull something:

- Face the object squarely, with one foot at least 12 in. in front of the other.
- Keep your back straight.
- Bend your knees slightly.
- Pull with one smooth motion.

Shoveling

General lifting procedures also apply to shoveling. Use the following procedure:

- Make sure your grip and balance are solid.
- Tighten you abdomen as you lift.
- Keep the shovel close to your body.
- Bend your knees not your back.
- Use the strength of the thighs to bring you to an upright position.
- Increase you leverage by keeping your bottom hand low and toward the shovel blade. This allows you to use the strength of your arms and shoulders instead of your back.

J:\MANUALS\SAFETY\PLANS\STDAPP.DOC

G

DECONTAMINATION

G

DECONTAMINATION

Everything leaving the exclusion zone must be decontaminated or properly discarded. The exclusion zone is to be defined in the Site Health and Safety plan. All personnel entering the exclusion zone must exit through the decontamination zone. All equipment is to be decontaminated and inspected before it is moved into the support zone. Decontamination solutions are to be appropriate for the hazards. Decontamination solutions are to be changed at least daily and stored on site until disposal arrangements are made. Any material generated by the decontamination procedures will be stored in a designated area in the exclusion zone until disposal arrangements are made.

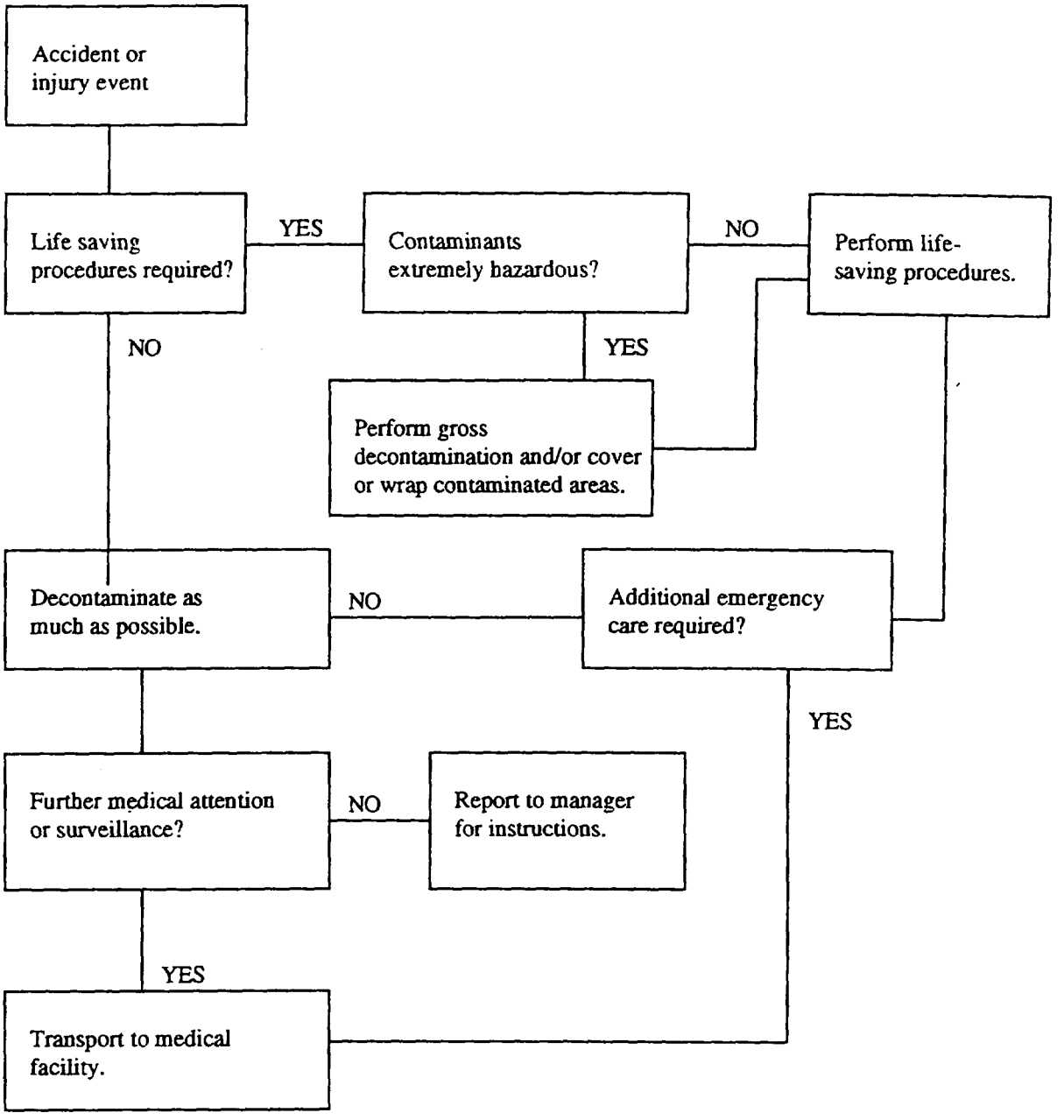
EMERGENCY DECONTAMINATION

The need for emergency decontamination of an individual may arise as the result of:

Injury or illness
Overexposure to chemicals or hazardous substances
Temperature stress

Primary consideration needs to be given to life-preservation actions and the minimization of additional harm or health risks to the individual in the emergency situation and the rescuing individuals.

EMERGENCY DECISIONS



LEVEL B ROUTINE DECONTAMINATION

Equipment Drop
Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths. Decontaminate or dispose of items before removal from exclusion zone.

Outer Boot/Glove Wash and Rinse
Scrub outer boots/gloves with decontamination solution then rinse with water.

Outer Boot/Glove Removal
Remove outer boots/gloves:

- If outer boots/gloves are disposable, deposit them in the appropriate plastic-lined container.

- If outer boots/gloves are not disposable, store them in a clean, dry place.

Outer Garment Removal
If using self-contained breathing apparatus (SCBA), remove SCBA back pack and remain on air as long as possible. Remove chemical-protective outer garments and deposit in the appropriate container.

Respiratory Protection Removal
Remove hard hat and face piece, and deposit on a clean surface. Wash and rinse hard hat and face piece. Wipe off and store face piece in a clean, dry location.

Inner Glove Removal
Remove inner gloves and deposit in the appropriate container for disposal.

Field Wash
Thoroughly wash hands and face with soap and water. Shower as soon as possible.

LEVEL B DECONTAMINATION FOR AIR TANK EXCHANGE

Equipment Drop
Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths. Decontaminate or dispose of items before removal from exclusion zone.

Outer Boot/Glove Wash and Rinse
Scrub outer boots/gloves with decontamination solution then rinse using water.

Outer Boot/Glove Removal
Remove outer boots/gloves:

- If outer boots/gloves are disposable, deposit them in the appropriate plastic-lined container.

- If outer boots/gloves not disposable, store them in a clean, dry place.

Tank Change
Exchange air tank. Don new outer boots/gloves. Tape joints and return to exclusion zone.

LEVEL C ROUTINE DECONTAMINATION

Equipment Drop
Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths. Decontaminate or dispose of items before removal from exclusion zone.

Outer Boot/Glove Wash and Rinse
Scrub outer boots/gloves and/or splash suit with decontamination solution then rinse with water.

Outer Boot/Glove Removal
Remove outer boots/gloves:

- If outer boots/gloves are disposable, deposit in them in the appropriate plastic-lined container.

- If outer boots/gloves are not disposable, store them in a clean, dry place.

Outer Garment Removal
Remove chemical-protective outer garments and deposit them in the appropriate container.

Respiratory Protection Removal
Remove hard hat and respirator and deposit them on a clean surface. Discard respirator cartridges in the appropriate container. Wash and rinse hard hat and respirator. Wipe off and store respirator in a clean, dry location.

Inner Glove Removal
Remove inner gloves and deposit them in the appropriate container for disposal.

Field Wash
Thoroughly wash hands and face with soap and water. Shower as soon as possible.

LEVEL C DECONTAMINATION FOR RESPIRATOR-CARTRIDGE EXCHANGE

Equipment Drop
Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths. Decontaminate or dispose of items before removal from exclusion zone.

Outer Boot/Glove Wash and Rinse
Scrub outer boots/gloves and/or splash suit with decontamination solution then rinse with water.

Outer Boot/Glove Removal
Remove outer boots/gloves:

- If outer boots/gloves are disposable, deposit them in the appropriate plastic-lined container.
- If outer boots/gloves are not disposable, store them in a clean, dry place.

Respirator Cartridge Change
Exchange respirator cartridges. Don new outer boots/gloves. Tape joints and return to exclusion zone.

LEVEL D-MODIFIED ROUTINE DECONTAMINATION

Equipment Drop
Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths. Decontaminate or dispose of items before removal from exclusion zone.

Outer Boot/Glove Wash and Rinse
(Optional, include if necessary for gross decontamination)
Scrub outer boots/gloves and/or splash suit with decontamination solution then rinse with water.

Outer Boot/Glove Removal
Remove outer boots/gloves:

- If outer boots/gloves are disposable, deposit them in the appropriate plastic-lined container.
- If outer boots/gloves are not disposable, store them in a clean, dry place.

Outer Garment Removal
Remove chemical protective outer garments and deposit them in an appropriate container. Remove hard hat and safety glasses. Decontaminate them as necessary and deposit on a clean surface.

Inner Glove Removal
Remove inner gloves and deposit them in the appropriate container for disposal.

Field Wash
Thoroughly wash hands and face with soap and water. Shower as soon as possible.

J:\MANUALS\SAFETY\PLANS\STDAPP.DOC

H

FIELD EMERGENCY RESPONSE PROCEDURES

H

FIELD EMERGENCY RESPONSE PROCEDURES

Based on the type of potential hazards that may be present, the Site Safety Officer (SSO) is to determine if a site specific emergency response plan is necessary prior to the beginning of work. If a site specific plan is necessary, it is to be attached to the Site Safety Plan (SSP).

FIRES AND EXPLOSIONS

Even a minor fire can become a serious problem, particularly when adjacent to flammable or combustible materials. The first few minutes after discovery of a fire are the most critical in preventing a larger emergency.

In case of a fire or explosion, immediately turn off burners and other heating devices and stop any work in progress. Give priority to assisting injured persons.

Small Fires
Take the following actions immediately:

- Alert other personnel in the vicinity and send someone for assistance
- If it is a small fire - one that can be extinguished within 30 seconds or with one fire extinguisher - attempt to extinguish the blaze if:
  - Conditions are safe
  - You have the proper type of fire extinguisher
  - You have been trained to use a fire extinguisher properly
  - You are not alone

The combination (ABC) extinguishers in the Montgomery Watson Emergency Kits can be used against the following classes of fires:

- Class A fires - ordinary combustible solids such as paper, wood, coal, rubber and textiles
- Class B fires - petroleum hydrocarbons (diesel fuel, motor oil and grease) and volatile flammable solvents
- Class C fires - electrical equipment

These extinguishers, however, are not effective against Class D fires which include combustible or reactive metals (such as sodium and potassium), metal hydrides or organometallics. Special Class D extinguishers are required.

Avoid entrapment by a fire; always fight from a position accessible to an exit.

If there is any chance that the fire can not be controlled by locally available personnel and equipment, the following action should then be taken:

- Activate the emergency alarm system (if available) and notify the local fire department.
- Confine the emergency to prevent further spread of the fire.
- Assist injured personnel and provide first aid or transportation to medical aid, if necessary.

Next notify client if the client is in close proximity to the fire. (If not, notify the fire department). Assess the need with the client to contact the fire department. If the fire department is contacted, be prepared to tell them:

- Who you are
- Your location
- Type of fire (i.e., electrical, chemical, combustible solids, vapor)
- If the fire is extinguished
- The need for medical assistance
- Other potential hazards in the area (i.e., proximity to bulk tanks, downed electrical lines, poor access)

- What you will be doing after you hang up the phone and where they can find you or reach you

Upon arrival of the local fire department, brief them of the incident. When given permission, contact the Project Manager (PM) or in the PM's absence, the Office Supervisor or Corporate Health and Safety Manager.

Large Fire or Explosion

If other people are in the area, immediately notify them and then call the local fire department. Be prepared to tell them:

- Who you are
- Your location
- Type of fire (i.e., electrical, chemical, combustible solids, vapor)
- If the fire is extinguished
- The need for medical assistance
- Other potential hazards in the area (i.e., proximity to bulk tanks, downed electrical lines, poor access)
- What you will be doing after you hang up the phone and where they can find you or reach you

Upon arrival of the fire department, turn over command to them and supply as much information as possible. When given permission, contact the PM or in the PM's absence, the Office Supervisor or Corporate Health and Safety Manager. Get a number where they can again be reached.

FLAMMABLE/COMBUSTIBLE LIQUID SPILLS

If a spill of a flammable or combustible liquid occurs, all possible sources of ignition should be extinguished or removed immediately.

Use Material Safety Data Sheets (MSDSs), analytical information from laboratory personnel, and any other available sources of information, together with your own expertise to determine if spill control and clean up can be safely accomplished with the personnel and materials on site.

The following general spill clean up procedures can be utilized, but more specific techniques might be required for certain chemicals.

- Vermiculite or other suitable absorbent may be used to solidify free liquids.
- Both spilled liquids and solids residues must be contained in drums.
- If a spill occurs on soil, it must be scraped and contained.

EVACUATION

Prior to beginning work, the SSO should brief all Montgomery Watson and subcontractor employees on what the evacuation signal should be. It may be nothing more than a verbal command or it may be some audible alarm such as a bell or horn. If working at a client's site, familiarize yourself with their warning system.

Prior to work, the SSO should determine a meeting place if evacuation is necessary. Preferably the meeting place should be upwind of the work activities and at a safe distance. All Montgomery Watson and subcontractor employees should be informed of the meeting location.

If evacuation is necessary, everyone should go directly to the meeting area. The SSO should ensure all personnel (Montgomery Watson and subcontractor) are accounted for. This will mean checking the sign-off documentation on the Site Safety Plan or on larger jobs the daily sign-in roster. The local on-scene commander should immediately be notified of any missing personnel as well as their last known whereabouts.

Site Evacuation
If an evacuation of the site is necessary, certain rules must be strictly followed:

- Employees in the vicinity should immediately shut down all equipment and disconnect electrical or flammable power sources to machinery.
- Immediately after personnel are alerted, they will evacuate the facility via the nearest escape route.
- All evacuated personnel will assemble at the predetermined meeting place.
- Employees should not wait for friends; the Site Safety Officer will ensure all personnel have evacuated before departing.
- Employees should move quickly and calmly without panic.
- Employees should not smoke.

- Once assembled, employees should remain calm and quiet while the Site Safety Officer takes roll call and assesses the situation. Each employee must report to the Site Safety Officer until everyone is accounted for and evacuation is complete.

Off-Site Evacuation

If an incident is large enough, off-site personnel may also need evacuation. If off-site evacuation is necessary, follow the appropriate local notification procedures, generally through the fire department. Montgomery Watson personnel should not attempt to evacuate off-site personnel but should leave that task to the local authorities. All Montgomery Watson employees should follow the evacuation directions given by the local authorities. The Site Safety Officer should offer to remain at the command post to supply information. If told to leave, the SSO should leave.

Local authorities will have present an on-scene commander. The on-scene commander will direct emergency operations and will have assistance from the local fire department, police department and emergency government.

After evacuating to a safe area, the PM should be contacted or in the PM's absence, the Office Supervisor or Corporate Health and Safety Manager.

DISCUSSION OF INCIDENT

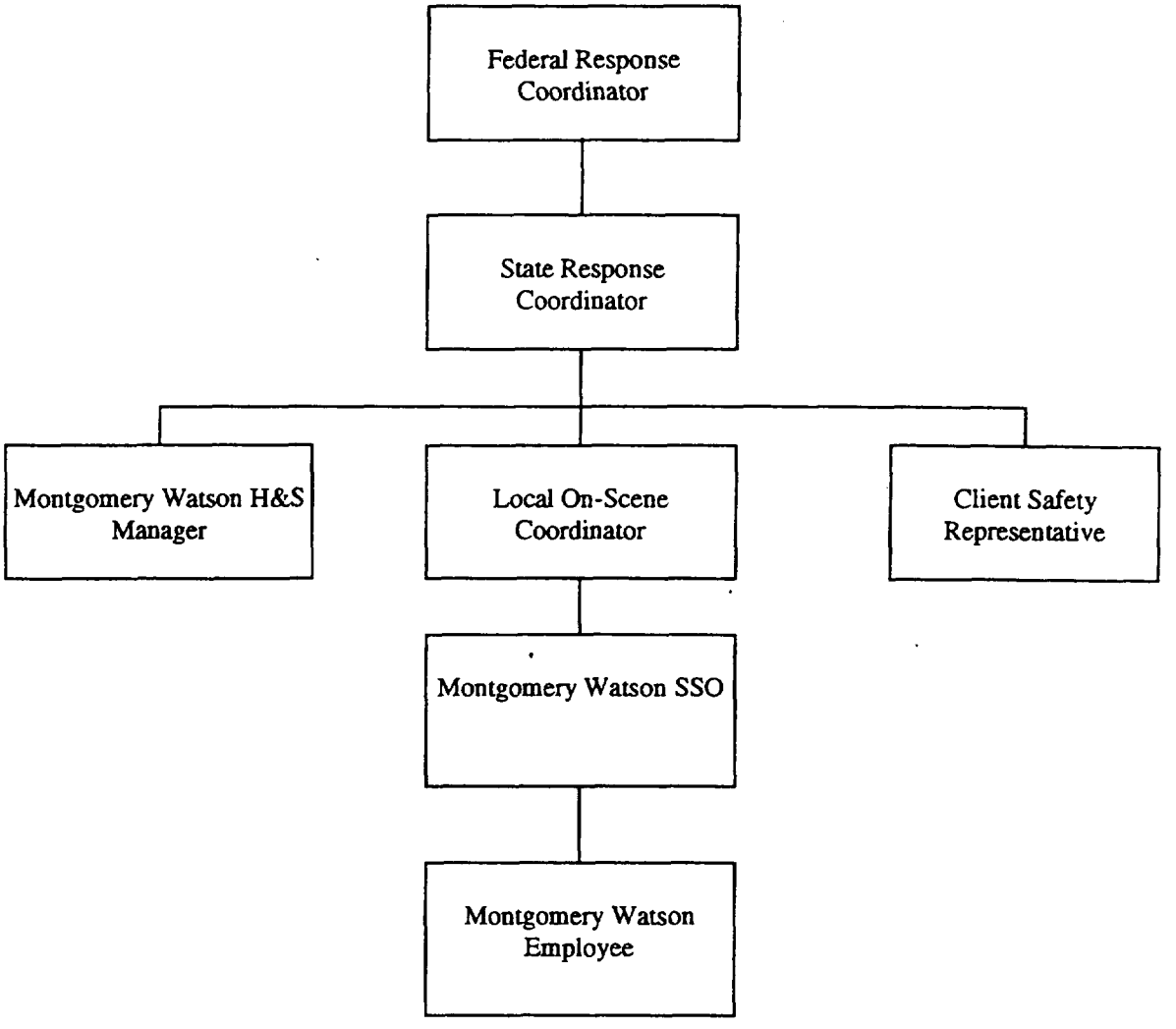
At no time should a Montgomery Watson employee discuss an emergency incident with members of the media. Politely refuse to discuss the situation and instead, direct all inquiries to the Corporate Health and Safety Manager. Provide the media people with the office phone number.

However, Montgomery Watson employees should always provide whatever useful information they can to response personnel. Stick to helpful facts and avoid placing blame or judgement. That will be sorted out later. Politely refuse to find fault or place blame.

At a safe place and at the appropriate time, write down all you remember of the incident. How did it happen? Who was doing what? What did I see? What did I hear? All these types of things may be important later when things are sorted out.

CHAIN-OF-COMMAND

The number of people involved in an incident will be directly related to the severity of the incident. In the event of an incident, the chain-of-command could be as extensive as:



Upon arrival of the local on-scene coordinator or client safety representative, the Montgomery Watson SSO should turn over command of the situation. The responsibility of the Montgomery Watson SSO is then to supply information and offer Montgomery Watson supplies and personnel if requested. It is likely the local on-scene coordinator or client safety representative will not request Montgomery Watson personnel but may request Montgomery Watson supplies (HNu, absorbent, drums). In a major incident, it is likely the Montgomery Watson Health and Safety Manager will arrive at the scene. At that time, all responsibilities of the SSO should be turned over to the Health and Safety Manager.

J:\MANUALS\SAFETY\PLANS\STDAPP.DOC

I

First Aid

I

FIRST AID

OPEN WOUNDS

Stop the bleeding by direct pressure, elevation, and if necessary, direct pressure on the supply artery. Do not attempt to cleanse severe wounds. Apply a sterile dry dressing to protect the wound from contamination. Provide shock care. Obtain medical attention.

MINOR BURNS

The object of first aid for burns is to relieve pain, prevent contamination, and prevent shock. First degree and second degree burns should be submerged in cold water until the pain subsides. Gently blot dry then apply a sterile dry dressing as a protective bandage. Do not break blisters, or remove any tissue. Do not use an antiseptic preparation, ointment or spray. Seek medical attention immediately if burns are severe.

EYE INJURIES

Foreign objects are often blown or rubbed into the eyes. Keep victim from rubbing eye. Wash hands before examining eye. Do not attempt to remove foreign objects by inserting toothpicks, or other instruments. If object is embedded in eye, seek medical attention immediately. If object is not embedded try to remove by teardrops, or flushing with water. If object is not easily removed, seek medical attention.

Contusions may be caused by direct blow or explosion. Stop hemorrhage by gently applying direct pressure, then protect eye from contamination with a dry sterile dressing. Seek medical attention immediately.

GENERAL SEQUENCE FOR TREATMENT OF EXPOSURES TO UNKNOWN CHEMICALS

1. Quickly protect yourself from exposure before attempting to rescue the victim.
2. Decontaminate the victim and terminate exposure.
3. Treat cessation of breathing first.
4. If the heart is not beating, perform cardiopulmonary resuscitation (CPR).
5. Treat eye injuries next.
6. Treat skin contact.
7. Treat shock.
8. Call for help.

PRELIMINARY ASSESSMENT

Make a quick assessment of the likely routes of exposure by examining the eyes, mouth, nose and skin of the victim for signs of the chemical itself or damage it has caused such as swelling, redness, bleeding, burns, discharge of fluid or mucous or pallor.

Drooling, difficult swallowing, a distended and painful or hard, rigid abdomen all indicate possible ingestion of a corrosive or caustic substance.

If respirations are rapid, shallow, noisy or labored, suspect inhalation.

If the face has been splashed with chemical, eye contact is likely.

POISONING BY INHALATION

Remove the victim from exposure while protecting yourself from exposure.

If breathing has stopped, administer artificial resuscitation using a disposable resuscitator and avoid mouth-to-mouth contact. **DO NOT** use mouth-to-mouth resuscitation if the nature of the chemical exposure is unknown.

Maintain an open airway.

Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.

POISONING BY INGESTION

Remove the victim from exposure while protecting yourself from exposure.

Call a poison control center, emergency room or physician for advice.

Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.

Consult the MSDS to determine whether to offer victim water to drink or to induce vomiting and by what means.

If the victim is conscious:

- Have the victim rinse out mouth with water.
- If there are no signs of burns, swallowing difficulty or abdominal problems and victim is conscious and if so advised by a physician or poison control center:
  - Induce vomiting by giving two teaspoons of Syrup of Ipecac. Follow with at least one cup of water. **DO NOT** use milk. If you do not have Syrup of Ipecac, induce vomiting by asking the victim to touch the back of the throat with a finger, spoon handle or blunt instrument.
  - Have the victim sit up or lean forward while vomiting.
  - Save any vomitus and give it to the emergency medical service personnel to take to the medical facility for analysis.
  - Give the victim one to two cups of water to drink after vomiting has ceased.
- Keep talking to the victim to prevent sleepiness.

If the victim is unconscious:

- Lay the victim on the victim's left side, bending the victim's right hip.
- Maintain an open airway.
- Arrange for transport to the nearest medical facility.

- Stand by to administer artificial resuscitation and CPR if needed. Be sure to wipe or rinse all traces of chemical from in and around the victim's mouth before giving artificial resuscitation. Always use disposable resuscitators supplied in the Montgomery Watson First Aid kits when performing CPR. **DO NOT** use mouth-to-mouth resuscitation if the nature of the chemical exposure is unknown.

- If breathing has stopped, administer artificial resuscitation using a disposable resuscitator and avoid mouth-to-mouth contact.

If the victim vomits, save the vomitus and send it to the medical facility for analysis.

If the victim shows signs of shock (a weak, rapid pulse; pale clammy skin; cold hands and feet), elevate the victim's feet eight to twelve inches and cover the victim with a blanket.

DO NOT give an unconscious person anything to drink.

DO NOT give someone who is convulsing anything to drink.

POISONING BY SKIN CONTACT

Remove the victim from the contaminated area, being careful to protect your lungs, skin and eyes.

Remove the victim's clothing, shoes and jewelry from the affected areas, cutting them off if necessary. Do this under a shower or while flushing with water.

Continue to flush with water until all trace of the chemical is gone and any slippery feeling has disappeared also. Rinse for at least 15 minutes.

Cover the victim with a blanket or dry clothing.

Notify a physician, emergency room or poison control center of the accident and obtain advice.

In case of inflammation, burns, blisters or pain:

- Loosely apply a dry sterile dressing, if available, or use a clean dry cloth.

- Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.

- If the victim is in a state of shock:

  - Lay the victim down on the victim's side and cover the victim with a blanket.

- Elevate the victim's feet eight to twelve inches.

- Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.

DO NOT break open blisters or remove skin. If clothing is stuck to the skin after flushing with water, do not remove it.

DO NOT rub or apply pressure to the affected area.

DO NOT apply any oily substance to the affected skin.

DO NOT use hot water.

POISONING BY EYE CONTACT

Remove the victim from the contaminated area, being careful to protect your lungs, skin and eyes.

Act quickly. Seconds count. Flush the victim's eye(s) with clean tepid water for at least 15 minutes. Have the victim lie or sit down and tilt head back. Hold eyelid(s) open and pour water slowly over the eyeball(s) starting at the inner corners by the nose and letting the water run out of the outer corners. The victim may be in great pain and want to keep eyes closed or rub them but you must rinse the chemical out of the eye(s) in order to prevent possible permanent damage.

Ask the victim to look up, down and side to side as you rinse.

Call an emergency medical service and arrange for transport to the nearest facility for examination and treatment as soon as possible. Even if there is no pain and vision is good, a physician should examine the eye(s) since delayed damage may occur.

If the eye(s) is(are) painful:

- Cover loosely with gauze or a clean, dry cloth
- Maintain verbal and physical contact with the victim

HYDROGEN CYANIDE EXPOSURE

Hydrogen cyanide is a Class A poison which can cause asphyxiation by ingestion, inhalation, or absorption of liquid or vapor through the skin (particularly eyes, mucous membranes, and feet). Hydrogen cyanide has a bitter almond odor and has a threshold limit value-ceiling-TLV-C of 4.7 ppm.

The SSO will notify the local medical facility if the potential for hydrogen cyanide exposure exists at the Site. This will allow emergency personnel to have the necessary equipment in the event of a cyanide exposure emergency.

Signs and Symptoms of Exposure

Inhalation

Very acute poisoning

- Victim cries out before losing consciousness
- Victim falls to the ground
- Wheezing
- Foaming at mouth
- Violent convulsions
- Almost immediate death

Acute poisoning

- Excitement phase
  - Headache
  - Breath smells of bitter almond
  - Dizziness
  - Nausea, occasionally vomiting
  - Rapid breathing
  - Anxiety and excitement
- Depression phase
  - Difficulty in breathing
  - Chest pain
  - Drowsiness
- Convulsion phase
  - Convulsions
  - Jaws clenched together
  - Foaming at mouth
  - Loss of consciousness

- Paralysis phase: If the subject survives, there is a risk of permanent nervous system damage.

  - Deep coma
  - Dilated pupils
  - Weak and irregular pulse
  - Breathing stops
  - Death

Slight poisoning

- Headache
- Dizziness
- Anxiety
- Difficulty in breathing

Ingestion
(See symptoms described under Inhalation - Acute to slight poisoning)
Burning tongue and mouth
Salivation
Nausea

Skin contact
The gaseous and liquid compounds are quickly absorbed by the skin and cause symptoms described under INHALATION, resulting in acute to slight poisoning. Depending on their nature, they can be very or only slightly irritating.

Splashing in eyes
Irritation and watering of eyes

When absorbed by mucous membranes of the eyes, these compounds can cause the same symptoms described in INHALATION, resulting in slight poisoning.

First Aid
Inhalation
Remove the victim from the contaminated area only after protecting yourself from exposure.

Have someone call the Emergency Medical Service and arrange for transport to a medical facility. Inform them of the nature of the exposure.

Remove contaminated clothing and equipment while wearing appropriate protective clothing.

If the victim has stopped breathing:

- Open airway, loosen collar and belt. Do not use direct mouth-to-mouth resuscitation for cyanide exposure. A bag-valve mask is required.
- Check the pulse.
- Continue your efforts until help arrives or the victim starts to breathe on their own.
- Keep the victim warm and quiet.

If the victim is unconscious but breathing:

- Lay the victim on their back. If the victim is vomiting, turn the head to the side.
- Clear the airway and loosen tight clothing.
- Keep victim warm and quiet.
- Do not leave the victim unattended.
- Never give an unconscious person anything to drink.

If the victim is conscious:

- Lay the victim down, cover the victim with a blanket and keep them quiet.
- Loosen tight clothing.

Ingestion

Start lifesaving treatment, call for help and, if possible, empty the stomach and prevent further injury caused by absorption. PROMPT TREATMENT IS LIFESAVING.

- Ask someone to call a poison control center, inform them of the chemical swallowed and follow their advice.
- Ask someone to call the Emergency Medical Service and arrange for transport to a medical facility.

If the victim is unconscious or unresponsive:

- Lay the victim on the left side and loosen the victim's collar and belt.
- Check the airway for obstruction.

If the victim stops breathing, administer artificial respiration using a bag-valve mask. Do not use direct mouth-to-mouth resuscitation.

If the victim is conscious and alert:

- Remove the victim from the contaminated area to a quiet, well ventilated area.
- Loosen tight clothing around the neck and waist.
- Have the victim rinse mouth several times with cold water and spit out.
- Give him 1 or 2 cups of water or milk to drink.
- Induce vomiting by touching the back of the throat with your finger, a spoon handle or a blunt object.
- Have the victim sit up and lean forward while vomiting.
- Save vomitus for analysis later. Avoid skin contact with it.
- Do not leave the victim alone.

DO NOT give an unconscious person or a person who is having a convulsion anything to drink. **DO NOT** give alcohol, drugs, or stimulants like tea or coffee. **DO NOT** continue to try to induce vomiting in someone who doesn't gag when you touch the back of his throat.

Skin contact

Remove the victim from the source of contamination and take them **IMMEDIATELY** to the nearest shower or source of clean water. Remove clothing, shoes, socks and jewelry from the affected areas as quickly as possible, cutting them off if necessary. Be careful not to get any of the chemical on your skin or clothing. Wash the affected area under tepid running water using a mild soap. Thoroughly rinse the affected area with tepid water. Dry the skin gently with a clean, soft towel. Notify a physician, emergency room, or poison control center and inform them of the nature of the substance and the accident. Arrange for transport to the nearest medical facility. Do not leave the victim alone. Watch for signs of systemic toxicity.

If the skin is inflamed or painful, put the painful part in cold water or apply cold wet dressings on the burned area.

Eye contact

Remove all the chemical from the eye(s) quickly. Remove the victim from the source of contamination and take them to the nearest eye wash, shower, or other source of clean water. Gently rinse the affected eye(s) with clean, lukewarm water for at least 15 minutes. Have the victim lie or sit down and tilt their head back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out the outer corners. Ask the victim to look up, down and side to side as you rinse in order to better reach all parts of the eye(s). Have the victim remove contact lenses if they are wearing

them. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible. Tell the Emergency Medical Service personnel the name of the chemical and the nature of the accident. Even if there is no pain and vision is good, a physician should still examine the eye(s) since delayed damage may occur. If the victim cannot tolerate light, protect the eye(s) with a clean, loosely tied handkerchief or strip of clean, soft cloth or bandage. Be sure to maintain verbal communication and physical contact with the victim.

DO NOT let the victim rub eye(s). **DO NOT** let the victim keep eyes tightly shut. **DO NOT** introduce oil or ointment into the eye(s) without medical advice. **DO NOT** use hot water.

In all instances when performing First Aid procedures personnel should follow guidelines for Bloodborne Pathogens. Use the PPE - gloves, disposable mouth-to-mouth resuscitators, safety goggles and overgarments supplied in Montgomery Watson First Aid kits. Report all First Aid incidents to the Health and Safety Manager immediately.

J:\MANUALS\SAFETY\PLANS\STDAPP.DOC

J

CONFINED SPACE ENTRY

J

CONFINED SPACE ENTRY

DEFINITION OF CONFINED SPACE

A confined space is defined as an enclosed space which meets all of the criteria below:

- Is large enough that a person can enter it and perform assigned work
- Has a limited means for exit or entry such as a tank, vessel, silo, storage bin, hopper, vault, pit, trench, or diked area
- Is not designed for continuous human occupancy
- Meets any of the following criteria:
  - Contains or has a known potential to contain a hazardous atmosphere
  - Contains a material with the potential for engulfment of an entrant
  - Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or a floor which slopes downward and tapers to a small cross-section
  - Contains any other recognized serious safety or health hazard

If you can not enter and exit an enclosed space by walking into and out of it in an upright manner, it has a limited means of exit/entry and may be a confined space. Open-top spaces which require the use of ladders, hoists or other devices for exit may be confined spaces.

Spaces designed to store product, enclose materials and processes, or transport products or substances can be confined spaces. They are generally not designed for persons to enter and work in them on a routine basis though they may have limited access for occasional worker entry for inspection, maintenance, repair, cleanup, etc.

A trench is defined as a narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench, measured at the bottom, is not greater than 15 feet.

An excavation less than five feet deep with no potential for cave-in does not need the protection requirements (sloping, shoring, etc.) required by OSHA in its Excavation Regulations, but it might still be considered a confined space. OSHA requires air monitoring for entry into excavations over 4 ft deep if there is a potential for encountering hazardous atmospheres. If excavations are less than 4 ft deep and personnel are kneeling or performing work requiring them to bend over, air monitoring is still required because their heads are below the ground surface and gases heavier than air may accumulate in these areas.

MONTGOMERY WATSON REQUIREMENTS FOR CONFINED SPACE ENTRY

It will be Montgomery Watson Policy not to enter any confined spaces which:

- Have oxygen levels below 19.5% or more than 23.5%
- Have flammability greater than 10% LEL
- Contain toxic substances with concentrations that are above the IDLH concentration.

In situations where all of the above conditions are met, Montgomery Watson personnel will wear appropriate respiratory protection when toxic substances have concentrations above the TLV but less than the IDLH level. Complete permit required confined space entry procedures (Option #2 later in this SOP) will be implemented if respiratory protection must be worn during entry.

CONFINED SPACE ENTRY LIMITATIONS

The SSO is to allow entry into confined spaces only if all of the following criteria are met:

- The Site Safety Plan addresses confined space entry under the scope of site activities.
- The Health and Safety Manager has reviewed and signed the Site Safety Plan.
- The Health and Safety Manager has issued a Confined Space Entry permit to the SSO if Option #2 - Permit Required Confined Space Entry - is used.

- No other non-entry procedure can be used to complete the necessary work.
- There is no danger of engulfment.
- The atmosphere can not become IDLH.
- The atmosphere is tested before initial entry and continuously during the course of entry.

PROCEDURES

General

If a site contains confined spaces, the SSO will inform employees at the daily site safety meeting of the locations of the confined spaces. In addition all confined spaces will be posted with a sign reading "DANGER - PERMIT - REQUIRED CONFINED SPACE, DO NOT ENTER".

If personnel will not be entering the confined spaces during the course of the field project, the SSO will take effective means to prevent personnel from entering the confined spaces. These may include locking or barricading the entrance to the confined space.

The SSO will implement all necessary measures as indicated in this plan and will be responsible for health and safety aspects at the job site during confined space entry.

If personnel must enter the confined space as specified in the Site Safety Plan, they can do so under one of two options. The Site Safety Plan will specify the option to be used.

Determination of Confined Space Entry Options

The Health and Safety Manager will determine the necessary measures and precautions necessary to conduct confined space entry in a safe manner. There are two possible options for conducting entry.

Option #1 General Requirements:

- Requires no attendant
- Requires no permits
- Requires no additional rescue provisions other than those in the Site Safety Plan
- Requirements of Confined Space to meet Option #1:
- Only hazard is actual or potential hazardous atmosphere

- Ventilation alone is sufficient to maintain safety during entry
- No hot work, use of solvents or other hazardous materials is allowed in the space
- Work outside the space cannot produce hazardous vapors that will enter the space
- Sanding, scraping and loosening residue cannot be performed if hazardous vapors are generated
- Forced ventilation alone will maintain safe conditions during entry

Option #2 Permit Required Confined Spaces General Requirements:

- Requires Confined Space Entry Permit
- Requires attendant
- Requires special rescue provisions

Conditions that Require Use of Option #2:

- Hazards are "unknown"
- Hazards cannot be controlled by ventilation alone
- Respiratory protection is needed to keep exposure below permissible exposure limits
- Hot work or use of solvents or other hazardous materials is required in the confined space
- Sanding, scraping and loosening of residue may release hazardous vapors

Guarding of Street Openings

When the entrance to a confined area is located in a street, the vehicle's beacon and 4-way flashers shall be activated upon approach to the area.

Vehicles shall be parked in such a way that traffic will flow in an unobstructed manner, and where possible, the vehicle shall provide protection of workers.

Vehicles shall be parked in such a manner that exhaust fumes cannot accumulate in the confined area. If this is not possible, the vehicle's exhaust stack shall be extended away from the confined area.

- Cone Placement. Before uncovering a manhole, traffic safety cones shall be placed around the manhole and any vehicle, and shall be visible to traffic in all directions. Cones shall be placed to protect the workers and to channel traffic flow. Cones shall

be placed at sufficient distances and intervals in accordance with local traffic ordinances, to adequately warn oncoming traffic.

- Additional Safety Signals. In areas of high traffic volume or other sites warranting additional warning devices, illuminated traffic arrows, barricades, and "Men Working" signs shall be used.

When placement of the vehicle creates a situation of having only one open lane of traffic in a congested area, a flagman shall be used to direct traffic flow.

Traffic safety vests or equivalent shall be worn at all times when working on the street or easement surface in the field.

Air Quality

Workers shall be properly equipped and trained to recognize, understand and control air quality hazards that may be encountered in confined areas.

Sampling of the atmosphere throughout every confined area shall be performed by the SSO before entry. The air quality shall be determined for all levels and all areas of the confined space.

A sampling meter with audible or visual warning devices, or both, which simultaneously incorporates tests for oxygen deficiency and combustible gases shall be provided and used to test the atmosphere of the confined area. Hydrogen sulfide may be monitored as well in certain situations.

Oxygen Deficiency

Calibration of the sampling meter shall be performed each day by the SSO where the air is most likely to contain the natural 20.9% oxygen.

When sampling the atmosphere of a confined area, a nonsparking probe shall be used. For manholes the probe shall be inserted through the pick-hole of the manhole cover, or the cover shall be pried open on the downwind side to allow just enough room for insertion of the probe.

A confined area shall not be entered if the oxygen content is less than 19.5% or greater than 23.5%.

Combustible Gases

The meter shall be zeroed and calibrated each day by the SSO with a standardized combustible gas supply.

A confined area shall not be entered if the sampling meter indicates 10% or more of the Lower Explosive Limit, L.E.L.

Hydrogen Sulfide
The sampling meter shall be zeroed and calibrated each day by the SSO with a standardized hydrogen sulfide gas supply.

A confined area shall not be entered if the sampling meter indicates 10 ppm or more of hydrogen sulfide.

Organic Vapors
Organic vapors may be monitored if they are suspected of being present in the confined space.

A confined area shall not be entered if testing indicates the presence of toxic materials in excess of IDLH levels. If levels are less than the IDLH level but above the permissible exposure level, appropriate respiratory protection as specified in the Site Safety Plan will be worn.

Adequate Air Quality. Entry to a confined area shall be made only after sampling indicates adequate air quality in accordance with the limits specified above.

Continuous monitoring of the atmosphere shall be conducted in the worker's immediate area while in the confined area.

Monitoring shall be achieved by a surface instrument or one worn on the worker's belt.

Signals from the monitoring instrument shall immediately indicate when workers are to exit the confined area.

Forced ventilation may not be used in lieu of air quality measuring devices.

OPTION #1 - WORK PROCEDURE

If the confined space only poses the hazard of an actual or potential hazardous atmosphere and ventilation alone is sufficient to maintain safety during entry, this option can be used. The Health and Safety Manager will review operations and associated hazards, chemical data and physical characteristics and will determine if this option is acceptable and will specify in the Health and Safety Plan the necessary measures to implement this option. The Health and Safety Manager must be notified before this option can be initiated.

If an initial entry into the space is required to determine the state of the confined space or eliminate hazards, Option #2 (Permit Entry) must be used. All confined spaces will be considered permit required confined spaces until the SSO has evaluated and demonstrated otherwise.

The SSO will determine if this option meets the requirements below and will document and certify that they have done so.

The following procedure will be used for Option #1 confined space entry.

Any conditions making it unsafe to remove an entrance cover shall be eliminated by the SSO before the cover is removed.

These conditions may include:

- High temperature
- High pressure

The cover should be checked to see if it is hot and it should be loosened slowly to gradually reduce residual pressure.

When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each person working in the space from foreign objects entering the space.

Before personnel enter the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for the following conditions in the order given:

- Oxygen content
- Flammable gases and vapors
- Potential toxic air contaminants

There may be no hazardous atmosphere within the space whenever any worker is inside the space.

Continuous forced air ventilation shall be used as follows:

- Personnel may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere.

- The forced air ventilation shall be so directed as to ventilate the immediate areas where personnel are or will be present within the space, and shall continue until all personnel have left the space.

- The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.

The atmosphere within the space shall be monitored continuously to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.

If a hazardous atmosphere is detected during entry:

- Personnel will exit the space immediately.
- The Health and Safety Manager will be contacted immediately.
- The space shall be evaluated to determine how the hazardous atmosphere developed.
- Work will continue under Option #2 - Permit Required Confined Spaces or as directed by the Health and Safety Manager.

The SSO shall verify that the space is safe for entry and that the measures required above have been taken, through a written certification that contains the date, the location of the space, and the signature of the person providing the certification. The certification shall be made before entry and shall be made available to each employee entering the space.

OPTION #1 - ENTRY CERTIFICATION

Date: _____

Location of Space: _____

I hereby certify that the confined space identified above is free from atmospheric hazards as well as physical hazards and that personnel may enter as required above. I have contacted the Health and Safety Manager before implementing this option.

SSO Signature: _____

SSO Name (Print): _____

OPTION #2 - WORK PROCEDURE

Option #2 requires the full implementation of the confined space permit program. This option will be used when:

- Confined space hazards cannot be controlled through ventilation alone.
- The confined space contains hazards that cannot be eliminated without first entering the confined space.
- The confined space has hazardous vapors in concentrations greater than the TLVs but not greater than IDLH levels.

- In "unknown" situations where there is insufficient information about the nature of hazards in a confined space to implement Option #1.

- Hazards arise while working under Option #1.

The following procedure will be used for Option #2 confined space entry.

- The SSO will direct and supervise confined space entry procedures.

- A Confined Space Entry Permit will be issued by the Health and Safety Manager. The top part of the form will be completed by the Health and Safety Manager which will stipulate the necessary equipment and safety measures necessary to proceed with the entry. The SSO will complete the bottom portion of the permit prior to time of entry. The SSO will post the completed permit at the entrance of the confined space during time of entry. After completion, the original white copy is to be forwarded to the Health and Safety Manager.

- The SSO will obtain the necessary air monitoring equipment, personal protective equipment, rescue equipment and other materials as required by the site safety plan and entry permit.

- The SSO will contact the local rescue service as indicated in the site safety plan and inform them of the location of the site, dates/times of entry, hazards that may be confronted and any other pertinent information requested by the rescue service so they can develop the appropriate rescue plan in the event of an emergency.

- The SSO will complete the permit and certify that all conditions are met before proceeding with entry.

- The maximum duration of a permit will be 8 hrs. New permits must be completed at the beginning of each day and at the end of the 8-hr period if work progresses beyond a normal 8-hr day. The SSO may determine that a more frequent permit completion schedule is warranted due to site conditions or changes in personnel or procedures.

- The SSO will hold a pre-entry meeting with all personnel involved with the confined space entry. The meeting will include the procedures that will be used, hazards and safety precautions necessary to conduct the entry in a safe manner. Safety equipment, communications, work practices emergency procedures and personnel roles and responsibilities will be discussed.

- The SSO will use lock-out tag-out procedures to eliminate hazards associated with electrical energy, pneumatic energy, hydraulic energy, steam lines, inlet lines or any other physical hazards.

- Before personnel enter the space, any conditions that make it unsafe to remove the entrance cover will be eliminated by the SSO. These may include high temperature or pressure.

- When entrance covers are removed, the opening will be promptly guarded by the designated attendant.

- Before entry by the authorized entrant(s), the SSO will monitor the space for oxygen, LEL and toxic vapors as specified on the permit and in the health and safety plan. The SSO will monitor from outside the space.

- Monitoring shall be performed every 4 ft down and 4 ft laterally to check for stratified hazardous atmospheres.

- If levels of oxygen are less than 19.5% or greater than 23.5%, flammability is greater than 10% LEL, or the space contains substances with concentrations greater than IDLH level, forced air ventilation will be used to purge the space. The SSO will perform air monitoring to see that the ventilation is adequately reducing the air hazards. Personnel are not to enter the space until oxygen is between 19.5% and 23.5%, LEL is less than 10% and toxic substances have concentrations below the IDLH level.

- Forced ventilation should be directed toward the work area and will be used constantly during times of entry.

- If air monitoring reveals toxic substance concentrations in excess of the TLVs, the SSO will direct entrants to don the proper level of protection as indicated in the Site Safety Plan.

Under no circumstances shall a person enter a confined area without another person standing by at the entrance.

A person entering a confined area shall have voice or other means of communication to persons outside the confined area at all times.

Prior to entry to a manhole or top entry to a confined area, a winch shall be set up for rescue purposes.

A person entering vertically into a confined area shall wear a full-body harness secured to a life line. The harness shall have a waist belt, shoulder straps, leg straps and a ring attached no lower than the shoulder blades. The life line shall be attached to the winch drum which will be used for emergency retrieval. The attendant will initiate rescue by using the winch in an emergency.

TRAINING

The following outlines the minimum topics that must be covered in annual confined space entry training for the types of individuals noted.

All Employees Who May Be Required to Enter Confined Spaces in the Course of Their Employment

- Procedures and control for entry
- Emergency action plan
- Hazard recognition
- Nature of hazards
- Testing to be performed to determine if it is safe to enter
- Toxic effects and symptoms of exposure to anticipated hazardous materials via absorption, inhalation and/or ingestion
- Use of personal protective equipment including respirators and clothing, required for entry or rescue and barriers or protective shields
- Self-rescue
- Evacuation requirements
- Modifications of normal work practices that are necessary for confined space work

Persons Authorizing/In Charge of Entry, Site Safety Officers

- All of the requirements noted for employees who may be exposed to permit entry of confined spaces in the course of their employment
- Recognition of the effects of exposure to hazards reasonably expected to be present
- Duties outlined in this section

Attendants

- Emergency action plan

- Proper use of communications equipment furnished to communicate with entrants or summon emergency/rescue services
- Authorized procedures for summoning emergency/rescue services
- Recognition of early behavioral signs of intoxication caused by contaminants whose presence could be anticipated in the space
- Duties outlined in this section

INDIVIDUAL RESPONSIBILITIES

Health and Safety Manager
Provide annual training as outlined in this section. Review all Site Safety Plans requiring confined space entry. Issue Confined Space Entry Permits. Review completed permits annually.

Site Safety Officers
Review Site Safety Plan to confirm that the identity of each confined space on site has been noted. Post "Danger - Permit - Required Confined Space, DO NOT ENTER" signs.

Allow entry into confined spaces only if all of the following criteria are met.

- Confined space is not classified as IDLH.
- Oxygen is between 19.5% and 23.5%.
- Flammability is less than 10% LEL.
- No other non-entry procedure can be used to complete the necessary work.
- There is no danger of engulfment.
- The atmosphere can not become IDLH.
- The atmosphere is tested before initial entry and continuously during the course of entry.

Do not permit non-attendant permit confined space entries (under Option #2).

Prior to the start of site activities:

- Inform site workers of the location of each confined space to prevent inadvertent entry.

- Assure the availability and use of all personal protective equipment and clothing necessary for safe entry.

- Assure that rescue and safety related equipment, such as lifting or retrieval devices, are readily available prior to entry. Provide for and require the use of retrieval lines, or equivalent equipment, to make non-entry rescues possible.

Provide appropriate vehicle and pedestrian guards, barriers, or other means to protect the entry party and attendants from local traffic hazards and to protect non-entering employees from hazards arising from the confined space.

Do not authorize or allow employees who have not been trained in permit entry of confined spaces to enter any confined space.

All personnel entering permit confined spaces (Option #2) must wear a safety harness with a life-line which is attached to a mechanical retrieval device if the space is over 5 ft deep and the space is a vertical type confined space.

Determine actual and potential hazards associated with the space at the time of entry. Choose the appropriate means to execute a safe entry.

Assure all necessary control measures are completed:

- Isolation (i.e., lock-out, blanking, disconnections, etc.)
- Space preparation (i.e., cleaning, purging, inert atmosphere in place, etc.)

Assure, by appropriate testing, that the control measures used are effective.

Assure proper calibration of test and/or monitoring equipment.

When testing atmospheres, measure every 4 ft down and 4 ft laterally to check for stratified hazardous atmospheres.

Determine and evaluate the source (e.g., residue to be removed from space, leaking valve or pipe in space) of any atmospheric contamination found at the time of entry.

Provide an attendant for each permit entry of a confined space.

Complete the bottom portion of the "Confined Space Entry Permit".

Verify that the necessary pre-entry conditions exist. Record conditions and measured atmospheric gas levels on the "Confined Space Entry Permit".

Verify that an on-site rescue team is available if it is to be used.

Verify that the means for summoning the on-site rescue team or other emergency assistance is operable.

Complete all portions of "Confined Space Entry Permit". Assure that pre-entry and authorizing signatures portions of the permit are completed before any employee enters a confined space.

Terminate the entry upon becoming aware of a non-permitted condition.

May serve as attendant.

Send the completed white copy of the Confined Space Entry permit to the Health and Safety Manager.

Attendant

Remain outside the confined space. Under no circumstances is the attendant to enter the confined space, even in an emergency, until help arrives. Do not leave for any reason while entry continues, except for self-preservation, unless replaced by a qualified individual.

Maintain continuous communication with all authorized entrants within the confined space by voice, radio, telephone, visual observation or other equally effective means.

Order entrants to exit the space at the first indication of a non-permitted condition, unexpected hazard, indication of a toxic reaction, unusual conduct of entrants, external situation that could pose a hazard to the entrants.

Know the procedure and have the means to summon immediate emergency assistance.

Do not allow anyone to enter the confined space to affect a rescue unless that person is wearing appropriate PPE, including a safety harness with lifeline and the necessary respiratory protection.

Warn unauthorized persons not to enter, or to exit immediately if they have entered.

Assist in handling tools and materials, relaying messages, prevent fouling of air hoses and lifelines in use.

Perform non-entry rescues when using emergency retrieval device.

AUTHORIZED ENTRANTS

Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

Properly use equipment as required.

Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required.

Alert the attendant whenever:

- The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or
- The entrant detects a prohibited condition
- Exist from the permit space as quickly as possible whenever:
  - An order to evacuate is given by the attendant or the entry supervisor
  - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation
  - The entrant detects a prohibited condition
  - An evacuation alarm is activated.

J:\MANUALS\SAFETY\PLANS\STDAPP.DOC

K

EXCAVATIONS

K

EXCAVATIONS

Excavations pose two primary hazards to employees working in them. The first is cave-in of the sidewalls or sudden movement of soils which can entrap, bury or injure workers. The second hazard is associated with hazardous gases that are heavier than air which may accumulate in trenches or excavations and cause oxygen deficient conditions, explosive environments or be at concentrations that are hazardous.

Trench
A narrow excavation made below the ground in which the depth is greater than the width - the width not to exceed 15 ft.

Excavation
Any man-made cut, cavity, trench or depression in the earth's surface formed by earth removal.

Causes of Cave-ins

- **Soil Type** - Loose-grained sandy soils have little cohesive strength and are not self-supporting. Clays and silts tend to stick together and be self-supporting.

- **Moisture** - Water affects soil particle cohesiveness. Too much water affects the ability of soils to stick together allowing them to slide and move more easily. Too little water results in drying and cracking which allows soils to collapse.

- **Recent Excavations** - Soil that has never been disturbed is stronger than soil that has been previously disturbed.

- **Freezing and Thawing** - When water freezes, it expands, and when ice thaws, it contracts. Movement of soil and shoring materials can result from the expansion and contraction during freeze-thaw cycles.

- **Surcharged Loads** - Construction materials, heavy equipment and the weight of spoils piles all contribute to the downward force on soil. The greater the surcharged load, the less stable the soil will be.

- **Shock and Vibration** - Moving trains, highway traffic, pile driving and blasting are all source of vibration which can weaken the cohesiveness of soil.

- **Intersecting Trenches** - The point formed by the intersection of two trenches is particularly vulnerable to collapse if not properly protected.

WORK PRACTICES

Standard Montgomery Watson protocol is to not go into any excavation or trench if there is another work practice or engineering control that can be used to eliminate the need for entry. These include:

- Using a backhoe to collect soil samples from the base or sidewalls of an excavation.

- Assembling piping and other apparatus outside an excavation and then laying it in the excavation by remote means.

- Collecting air quality measurements by lowering a sampling line into the excavation.

- Conducting and documenting soil classification by taking pictures or by taking notes from outside the excavation.

If Montgomery Watson personnel must enter an excavation in the course of field activities, the SSO will act as the OSHA specified "competent person". No Montgomery Watson employee is to enter the excavation until the competent person inspects the excavation and determines conditions are safe for entry. When Montgomery Watson has hired subcontractors to perform excavation activities, the subcontractor will provide the competent person and perform necessary inspections and controls to conduct work in a safe manner. The Montgomery Watson SSO will monitor the subcontractors excavation activities and will ensure that the subcontractor corrects any deficiencies in the excavation or trenching operation that are noted.

The Montgomery Watson SSO (competent person) will keep detailed notes of the excavation inspections and determinations that conditions are safe for personnel to enter the excavation. The competent person will complete the Excavation Safety Checklist and inspect excavations at least daily. The inspections will include:

- Excavations
- Adjacent areas
- Protective systems
- Indications of possible cave-ins or protective system failure
- Hazardous atmospheres
- Any other hazardous conditions

Inspections shall be made again after every rainstorm or other hazard increasing occurrence.

When the competent person finds evidence of a condition that could result in possible cave-in, failure of protective systems, hazardous atmosphere or other hazardous condition, the hazards must be corrected before anyone is allowed to enter the excavation.

GENERAL REQUIREMENTS

The competent person shall inspect and ensure the following safeguards are in place during excavation operations.

- All surface encumbrances that create a hazard shall be removed, supported or safeguarded.
- Underground utilities such as sewer, telephone, fuel, electric, water lines or any other installation will be cleared before opening an excavation.
- While the excavation is open, underground utilities will be supported, protected or removed to safeguard workers.
- A means of egress must be located every 25 ft laterally along trenches 4 or more feet deep.
- Workers exposed to vehicular traffic must wear warning vests.
- Workers must not be permitted to work underneath loads handled by lifting or digging equipment.
- When mobile equipment is operated adjacent to an excavation or must approach the edge of an excavation, a warning system such as barricades, hand or mechanical signals, or stop logs must be used to prevent the equipment from falling into the excavation.
- When hazardous atmospheres exist or could reasonably be expected to exist in excavations, the competent person will perform air monitoring as specified in the Health and Safety Plan. Confined Space Entry procedures will be implemented during entry into excavations with hazardous atmospheres.
- Emergency rescue equipment, such as breathing apparatus, a safety harness and line will be available where hazardous atmospheric conditions exist or may reasonably be expected to develop during excavation work.

- Workers are not to work in excavations with accumulated water. Water removal equipment should be used as necessary and diversion ditches, dikes or berms used to direct surface runoff away from excavations.

- Excavations below the base of footings, foundations or walls are not permitted unless a support system designed by a professional engineer is in place.

- Sidewalks, pavement and other structures will not be undermined unless a support system is provided.

- Workers must be protected from loose rock or soil that poses a hazard by falling or rolling from an excavation face.

- All excavated soil piles, equipment and other materials must be at last 2 ft from the edge of excavations to prevent them from falling into the excavation.

- Walkways and bridges over excavations must be equipped with guardrails.

- Adequate barriers must be installed ground excavations or they must be barricaded to protect workers and the general public from fall hazards.

CAVE-IN PROTECTIVE SYSTEMS

The competent person will ensure that all workers in excavations be protected from accidental wall collapse. Protective measures are not required when:

- Excavations are made entirely in stable rock.

- Excavations are less than 5 ft deep and the competent person inspects the excavation and determines there is no potential for cave-in.

If excavations are over 5 ft deep or under 5 ft deep and there is a potential for cave-in, sloping, shoring or bracing is required to protect workers during entry into the excavation. There are three protection options. They are:

1. Slope the sides of the excavation no steeper than one and one-half horizontal to one vertical (34 degrees measured from horizontal).

2. Determine the slopes of the sidewalls based on soil classification.

3. Have a professional engineer design a protective system or select, a shoring or bracing system. This option requires a written copy of the design plan to be at the site.

When support systems are in place, materials are not to be excavated more than 2 ft below the bottom of the support and they must be installed and removed in a safe manner so workers involved with these operations are protected from collapse and cave-in.

SOIL CLASSIFICATION

For the most part, it will be Montgomery Watson's policy to slope all excavation that are to be entered according to Option 1. When Option 2 is used to determine the slope of excavation sidewalls, soil classification will be performed. Documentation of the classification is required. Soil and rock will be classified into one of four categories. They are:

Stable Rock: Natural Solid Mineral Matter

Type A: Cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

- The soil is fissured.
- The soil is subject to vibration from heavy traffic, pile driving, or similar effects.
- The soil has been previously disturbed.
- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater.
- The material is subject to other factors that would require it to be classified as a less stable material.

Type B:

- Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa).
- Granular cohesionless soils including: angular gravel (similar to crushed rock), silt loam, sandy loam and, in some cases silty clay loam and sandy clay loam.
- Previously disturbed soils except those which would otherwise be classed as Type C soil.

- Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration.

- Dry rock that is not stable.

- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C:

- Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less.

- Granular soils including gravel, sand, and loamy sand.

- Submerged soil or soil from which water is freely seeping.

- Submerged rock that is not stable.

- Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

Slope configurations for soil types A, B, and C are indicated at the end of this section. When classification is performed, the competent person will use at least one visual and at least one manual analysis as described below:

Visual Tests. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

- Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.

- Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

- Observe the side of the open excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

- Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

- Observe the opened side of the excavation to identify layered systems. Examine layered systems not identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.

- Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

- Observe the area adjacent to the excavation and the area within the excavation for source of vibration that may affect the stability of the excavation face.

Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/2 -in. in dia. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a 2 in (50 mm) length of 1/2-in. thread can be held on one end without tearing, the soil is cohesive.

Dry Strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

Thumb Penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. (This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488 - "Standard Recommended Practice for Description of Soils (Visual - manual Procedure)." Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by he thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification the soil must be changed accordingly.

Other Strength Tests. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.

Drying Test. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately 1 in. thick (2.54 cm) and 6 in. (15.24 cm) in dia until it is thoroughly dry.

- If the sample develops cracks as it dries, significant fissures are indicated.

- Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength should be determined.

- If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

Layered Systems. In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

Reclassification. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

EXCAVATION SAFETY CHECKLIST

(This form is to be completed daily.)

Project: _____ Project #: _____

Competent Person: _____ Date: _____

Utilities Checked

_____ Telephone
_____ Electric
_____ Natural Gas
_____ Water
_____ Sewer
_____ Cable TV
_____ Other

Secure Surface & Overhead Structures

_____ Power Poles
_____ Overhead Obstacles
_____ Roads
_____ Buildings/Foundations
_____ Sidewalks
_____ Other

Trench Depth

_____0-5' _____5'-10' _____10'-15' _____15'-20' _____>20'

Egress

Ladder Present in Trench _____ Yes _____ No
(Ladder required at trench depths of 4' or greater)
(Ladder to extend 36" above ground surface)
(Ladder or ramp within 25' of linear travel in either direction)

Soil Classification
Visual Analysis of Soil
_____ Cracks/Fissures/Spalling of Trench Sides
_____ Water Seeping From Sides or Bottom
_____ Different Soil in Layers
_____ Soil Previously Disturbed
_____ Underground Utilities Present
_____ Continuous Vibration Present

Penetrometer Reading: _____

	A	B	C
Penetrometer Reading	≥ 1.5 tsf Not Previously Disturbed Stable Dry Rock	1.5-0.5 tsf Previously Disturbed Cracks Fissures	<0.5 tsf Previously Disturbed Seeping Soil Wet Soil
Maximum Slope	53 deg. (3/4:1)	45 deg. (1:1)	34 deg. (1-1/2:1)

Vehicular Traffic

Area Properly Barricaded	_____Yes	_____No
Reflective Clothing Warn	_____Yes	_____No
Flagman Present as Necessary	_____Yes	_____No
Protective System in Place to Prevent Vehicles Unloading Fill Materials From Backing into Excavation	_____Yes	_____No

Other Hazards

Check for Hazardous Atmospheres

_____Oxygen _____Combustibles _____Organic _____Vapors _____Other

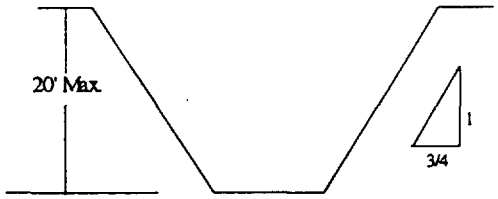
Confined Space Permit Acquired	_____Yes	_____No
Excavated materials and equipment at least 2 feet from edge of excavation and no other overhead hazards to personnel in excavation	_____Yes	_____No
Water removed from excavation	_____Yes	_____No
Ramps, Walkways, Bridges over Excavations Equipped with Handrails	_____Yes	_____No
Shoring System Designed by Professional Engineer	_____Yes	_____No
Excavations Barricaded or Filled in at End of Day	_____Yes	_____No

SLOPE CONFIGURATIONS

(All slopes stated below are in the horizontal to vertical ratio)

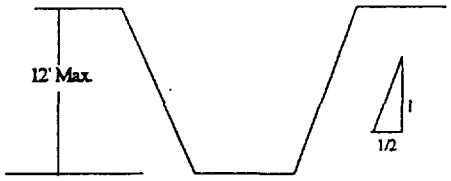
Excavations made in Type A soil.

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4: 1.



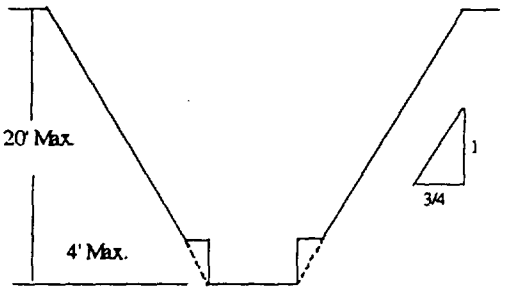
Simple Slope -General

Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of 1/2:1.



Simple Slope - Short Term

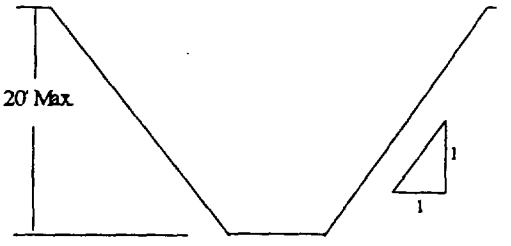
2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions as follows:



Simple Bench

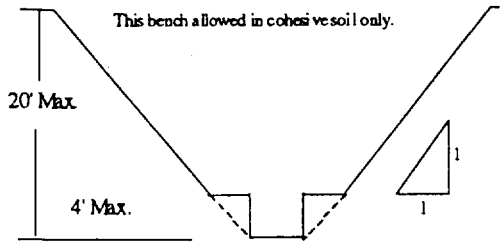
Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.



Simple Slope

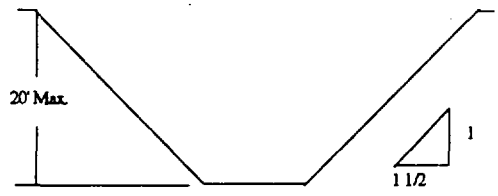
2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:



Single Bench

Excavations Made in Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 1/2:1.



Simple Slope

J:\MANUALS\SAFETY\PLANS\STDAPP.DOC

F

F

CONSTRUCTION QUALITY ASSURANCE PLAN

CONSTRUCTION QUALITY ASSURANCE PLAN

BLACKWELL FOREST PRESERVE LANDFILL
DUPAGE COUNTY, ILLINOIS

MAY 1997

PREPARED FOR:
FOREST PRESERVE DISTRICT
DUPAGE COUNTY, ILLINOIS

•••

PREPARED BY:
MONTGOMERY WATSON
ADDISON, ILLINOIS

PROJECT NO. 1252008.0409

LIST OF ACRONYMS/ABBREVIATIONS

ARARs	Applicable or Relevant and Appropriate Requirements
ASTM	American Standards for Testing Materials
CLP	Contract Laboratory Program
CRDL	Contract Required Detection Limits
CRQL	Contract Required Quanitation Limits
DO	Dissolved Oxygen
DQO	Data Quality Objective
EM	Electromagnetic Survey
ES-ANL	Energy Systems Division (Argonne National Laboratory)
FPD	Forest Preserve Districts (DuPage County)
FSP	Field Sampling Plan
GC	Gas Chromatography
IAC	Illinois Administrative Code
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NPL	National Priority List
PID	Photoionization Detector
PWD	Public Works Department (DuPage County)
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
RPD	Relative Percent Difference
SOP	Standard Operating Procedure
SOW	Statement of Work
SW846	Test Methods for Evaluating Solid Waste 1986.
SVOC	Semivolatile Organic Compounds
TAL	Target Analyze List
TCL	Target Compound List
TIC	Tentatively Identified Compound
TSC	Testing Services Corp.
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

TABLE OF CONTENTS

5

6

7

8

9

LIST OF TABLES

LIST OF APPENDICES

J:\1252\008\04\WP\RPT\98F_TOC.DOC

1

INTRODUCTION

The Construction Quality Assurance Plan (CQAP) has been prepared in conjunction with the Expedited Final Design Report for the leachate collection system (LCS) for the Blackwell Forest Preserve Landfill (landfill) in DuPage County, Illinois. This CQAP addresses quality assurance for construction of the LCS, including field sampling activities, not quality control. In the context of this CQAP, quality assurance refers to means and actions employed to provide conformity of the LCS installation with contractual and regulatory requirements.

Quality control refers to those actions taken to provide for materials and workmanship that meet the requirements of the design plans and specifications. Quality control is provided by the manufacturers and installers of the various components of the LCS.

The main emphasis of this CQAP is careful documentation of the construction quality assurance process, from the selection of materials through installation of the LCS. The scope of this CQAP applies to manufacturing, shipping, handling, installing, sampling, and design guidelines. Detailed specifications for construction of the LCS are contained in Appendix B of the Design. The field sampling plan, associated with the LCS construction, is included in this CQAP.

The CQAP consists of a project description, a discussion of the project organization and responsibility, construction quality assurance activities including sample testing procedures, construction inspection and documentation, and decontamination.

J:\1252\008\04\WP\RPT\98F_SEC1.DOC

2

PROJECT DESCRIPTION

2.1 SITE DESCRIPTION

The landfill is located approximately 6 miles southwest of downtown Wheaton, Illinois in Section 26, Township 39 North, Range 9 East, DuPage County, Illinois (Drawing A2). The Blackwell Forest Preserve encompasses 1200 acres of woodlands, grasslands, wetlands, and lakes. The landfill covers approximately 40 acres in the central part of the preserve.

2.2 PROJECT OBJECTIVES AND SCOPE

The objective of the LCS implementation as stated in the Work Plan is to design and install a LCS to extract, convey, and collect leachate from the landfill. The Design drawings are presented in Volume I of II.

The LCS installation includes the following components and associated activities:

2.2.1 Leachate Collection Pipe System

- Installation of leachate gravity conveyance pipes, leachate pressure conveyance pipes, compressed air lines, control wires, and gas header pipes (all below grade).

- Sampling for waste classification, if encountered, clay backfill testing, and clay sampling (if imported clay).

- Redirecting discharge of existing manhole MH-3 to gravity pipe flowing to holding tank.

- Installation of two dripleg pipe assemblies (below grade).

2.2.2 Leachate Well Pumps and Wellheads

- Installation of pneumatic well pumps, controls, and wellheads within below grade vaults.

- Sampling is not required.

2.2.3 Lift Station

- Installation of one lift station with one pump and controls.

- Sampling for waste classification, if encountered, granular bedding and clay backfill testing, and clay sampling (if imported clay).

- Redirecting discharge of manhole MH-20 to lift station, and upgrade existing road with crushed aggregate with turn-out for O&M access.

2.2.4 Leachate Holding Tank and Loadout

- Installation of buried 10,000-gal leachate holding tank, and loadout facility.

- Sampling for waste classification, if encountered, and sand bedding backfill testing.

2.2.5 Compressor Station and Electrical and Control System

- Installation of compressor station, building, control system equipment, electrical system lines and equipment, and crushed aggregate surface within fenced area.

- Sampling is not required.

Refer to the Design text, Specifications and Drawings in Volume I of II for additional LCS information.

Topics presented in the following sections of this CQAP include the following:

- Responsibilities and authorities of all organizations and key personnel involved in the design and construction of the response actions.
- Procedures for sampling and testing to monitor construction.
- Identification of quality assurance for sampling activities
- Reporting requirements

J:\1252\008\04\WP\RPT\98F_SEC2.DOC

3

PROJECT ORGANIZATION AND RESPONSIBILITY

3.1 RESPONDENTS

The Respondents are the official representatives of the Forest Preserve District (FPD) of Du Page County, Illinois. The FPD is responsible for implementing the project, and has the authority to commit the resources necessary to meet the project objectives and requirements. The FPD's primary function is to achieve the technical, financial, and scheduling objectives. Mr. Joseph Benedict will report directly to the U.S. EPA Project Manager and will provide the major point of contact and control for matters concerning the project.

At the direction of the FPD and the approval of the U.S. EPA, Montgomery Watson has overall responsibility for the construction of the leachate collection system (LCS). Montgomery Watson will perform the necessary construction management, oversight, and documentation for the LCS installation and prepare the Completion of Work Report. Project management will also be provided by Montgomery Watson under the direction of the FPD. The various quality assurance and management responsibilities of key project personnel are defined below. A site specific project organization chart is provided as Figure 2 with the Design in Volume I of II.

3.2 REGULATORY AGENCIES

The U.S. EPA Region V is the lead agency and is responsible for providing oversight of the landfill response actions, if necessary. The U.S. EPA Remedial Project Manager, Michael Bellot, has the responsibility for review and approval of this QAPP. The U.S. EPA Remedial Project Manager will act as the coordinator of communications between the U.S. EPA, Illinois EPA, and FPD/Montgomery Watson, and assuring contract compliance.

3.3 MONTGOMERY WATSON

Montgomery Watson is the consultant for the FPD and is responsible for implementing the Design.

3.3.1 Montgomery Watson Project Coordinator

The Montgomery Watson Project Manager is Mr. Peter Vagt. He has the overall responsibility for meeting U.S. EPA objectives and Montgomery Watson's quality standards. In addition, he is responsible for technical quality control and project oversight, and will provide the FPD with access to corporate management. The Montgomery Watson Project Coordinator will:

- Define project objectives and develop a detailed schedule.
- Acquire and apply technical and corporate resources as needed for project performance within budget and schedule constraints.
- Orient field leaders and support staff concerning the project's special considerations.
- Monitor and direct the field leaders.
- Review the work performed on each task for its quality, responsiveness, and timeliness.
- Review and analyze overall task performance with respect to planned requirements and authorizations.
- Approve external reports (deliverables) before their submission to the U.S. EPA.
- Ultimately be responsible for the preparation and quality of reports.
- Represent the project team at meetings and public hearings.

3.3.2 Montgomery Watson Field Team Leader

The Montgomery Watson Field Team Leader is to be determined. The Field Team Leader is support to the Montgomery Watson Project Coordinator. He is responsible for leading and coordinating the day-to-day activities of the various resource specialists under his supervision. The Montgomery Watson field team leader is a highly experienced environmental professional and will report directly to the Montgomery Watson Project Coordinator. Specific Field Team Leader responsibilities include:

- Provision of day-to-day coordination with the project coordinator on technical issues in specific areas of expertise.
- Adherence to work schedules provided by the Project Coordinator.

- Authorship, review, and approval of text and graphics required for field team efforts.

- Coordination and oversight of technical efforts of subcontractors assisting the field team.

- Identification of problems at the field team level, discussion of resolutions with the site manager, and provision of communication between team and upper management.

- Participation in the preparation of draft and final reports.

3.3.3 Montgomery Watson Quality Assurance Officer

The Montgomery Watson Quality Assurance Officer (QAO) is Mr. Walter Buettner. The QAO will remain independent of direct job involvement and day-to-day operations, and has direct access to corporate executive staff as necessary to resolve any QA dispute. He is responsible for auditing the implementation of the QA program in conformance with the demands of specific investigations, Montgomery Watson's policies, and state requirements. Specific functions and duties include:

- Provide QA audit on various phases of the field operations.
- Review and approval of QA plans and procedures.
- Providing QA technical assistance to project staff.

The Montgomery Watson Field Team Leader is responsible for field QAand will communicate with technical staff accordingly.

3.3.4 Technical Staff

The technical lead staff for this project is Mr. Dean Free. Additional technical support including that for construction for this project will be drawn from Montgomery Watson's pool of corporate resources. The technical staff will be utilized to gather and analyze data, and to prepare various task reports and support materials. All of the designated technical - staff are experienced professionals who possess the degree of specialization and technical competence required to effectively and efficiently perform the required work.

3.4 SPECIALIZED RESPONSIBILITIES

Monitoring and sampling operations and QC responsibilities will be managed as follows:

- Sampling, Monitoring, and Survey - Montgomery Watson

- On-site day-to-day field activities - Field Team Leader, Montgomery Watson

- Quality Control - An independent firm, subcontracted by Montgomery Watson

- Technical LCS Design Issues - Technical Lead Staff, Montgomery Watson

3.4.1 Laboratories

If necessary, analysis of waste/refuse for waste characterization by TCLP, using methods found in Tables F-2 and F-3, will be the responsibility of the contracted solid waste disposal facility and its hauler. If the contracted facility does not perform its own analyses, the work will be performed by:

First Environmental
1600 Shore Road
Naperville, IL 60563
(708) 778-1200

If necessary, analysis of clay and soils for grain size distribution and Atterberg limits, using methods indicated on Tables F-2 and F-3 will be performed by:

Testing Service Corporation
457 East Gundersen Drive
Carol Stream, IL 60188

Laboratory Data and QC responsibility will be managed as follows:

- Analytical protocol specified - First Environmental
- Review of analytical protocol -First Environmental QAO
- Review of field and laboratory analytical procedures - U.S. EPA QAS
- Internal QA/QC - First Environment QAO
- Final data review-chemist (external to the laboratory) - Montgomery Watson
- Review of tentatively identified compounds and assessment of need for confirmation - chemist - Montgomery Watson

Performance and Systems Audits responsibilities will be managed as follows:

Field Operations

- Internal Audits - QAO, Montgomery Watson
- External Audits - to be conducted at the discretion of the U.S. EPA.

Analytical Laboratories

- Internal Audits - First Environmental Laboratory and Testing Service Corporation-QAO's
- External Audits - to be conducted at the discretion of the U.S. EPA

Final Evidence File

- Final Evidence File Audits - QAO, Montgomery Watson

3.4.2 Contractors

The Contractor is the individual, or firm, responsible for constructing the LCS in conformance with the Design plans and specifications. The Contractor is also responsible for locating and transporting the required LCS materials and components to the site. The Contractor(s) may be under contract with the FPD, or Montgomery Watson.

The Contractor must be approved by the FPD. The Contractor must be able to provide qualified personnel to meet the demands of the project. The Contractor, unless otherwise approved by the FPD, must be qualified based on previously demonstrated experience and management ability; and have previously managed similar projects.

Well in advance of beginning earthwork activities, the Contractor must submit to the FPD and Montgomery Watson, the following:

- A list of specific equipment to be used on the project
- Company background information
- A demonstration of bonding capabilities
- A list of at least three comparable projects

J:\1252\008\04\WP\RPT\98F_SEC3.DOC

4

CONSTRUCTION QUALITY ASSURANCE ACTIVITIES

4.1 LEACHATE COLLECTION SYSTEM INSTALLATION

The LCS installation includes the components and associated activities listed in previous Section 2.2. Refer to the Design, Specifications and Drawings in Volume I of II for additional LCS information.

4.2 OBSERVATION AND INSPECTION

The Field Team Leader will be present on-site full-time during installation and construction of the LCS to document that construction is in accordance with the Design plans and Specifications. Field documentation personnel will utilize materials and equipment during construction including:

- Design documents, including Site Safety Plan and CQAP
- Daily field notes (logbook)
- Unified Soil Classification System summary
- Decontamination solutions, brushes, buckets
- Waste sample jars
- Sample labels
- Type measure
- Level, tripod, rod
- Pocket penetrometer
- Utility knife
- Duct tape
- Shelby tubes, caps
- Heavy black marking pen
- Soil sample bags, ties
- Troxler nuclear density meter and equipment
- Hardhat, steel toe boots, safety glasses
- Assorted gloves

The Field Team Leader will be responsible for the following activities:

- Perform construction QA
- QC will be performed by an independent subcontracted service
- Observe trenching and excavating activities
- Monitor excavated waste and sample if suspected hazardous
- Observe buried pipe connections
- Observe and document pressure tests of pipe, lift station, and tank
- Survey pipe, lift station, tank, and other pertinent inverts
- Observe installation of LCS components, bedding, and backfill
- Perform field density tests for each 12-in. thick lift of clay placed as backfill in trenches and excavations
- Collect clay samples for laboratory testing for imported off-site clay, only
- Observe installation of compressor station and electrical and control system
- Maintain daily field notes regarding construction
- Provide photographic documentation of construction
- Observe working condition of all LCS components

4.3 CONSTRUCTION TESTING AND MATERIAL QUALITY CONFIRMATION

Both in-field and laboratory testing will be performed to document that materials used are in conformance with Design plans and Specifications. The Contractor is responsible for selecting materials and components that meet project requirements. The Contractor will submit manufacturers information regarding selected materials to Montgomery Watson for approval prior to installation. Specific testing and sampling activities for the LCS are discussed below.

This section constitutes the field sampling plan, and addresses the sample collection activities associated with the LCS installation that will be conducted upon approval of this Final Design. The field sampling plan is required per the Administrative Order of Consent

(AOC), U.S. EPA Docket No. V-W-96-C-341, between the U.S. EPA and the Respondents, the Forest Preserve District of DuPage County, Illinois.

Sample collection activities will generally be performed to gather the following information as described in the following sections:

- Waste classification, if waste must be disposed of off-site and is suspected as hazardous based on PID readings
- Clay compaction tests

4.4 LEACHATE COLLECTION SYSTEM TESTING

4.4.1 Waste Classification Procedures

During the excavating for the pipe trenches, lift station, and other LCS equipment the contractor and Montgomery Watson will endeavor to not excavate and remove any waste materials that require off-site disposal. LCS components will be relocated or excavations will be increased slightly in size to accommodate any extra refuse. The minimum thickness and compaction requirements of the landfill cap will be maintained.

Refuse or soils removed during LCS excavations may also be returned to the excavations where possible, or reconsolidated beneath the landfill cap at another location. The refuse/excess soils reconsolidation area(s) will be selected during construction, as an area(s) along the crest of the landfill. The fill would be used to improve surface grades to promote drainage.

As a last resort, if waste must be disposed of off-site complete toxicity characteristics leaching procedures (TCLP) analytical testing will be performed to determine the proper disposal.

4.4.2 Compacted Clay Testing and Sampling

Clay testing and sampling will be required for installation of piping systems below the landfill cap, including the driplegs, and the lift station.

Piping runs within the landfill refuse limits will be placed in a trench that is constructed in the existing landfill cover. The excavated topsoil and clay cover materials removed during trenching operations will be reused during backfilling operations. Soil testing of clay cover soils replaced during backfill operations will be performed during construction.

Compacted clay testing will be performed as follows during all clay backfill of pipe trenches, driplegs, and the lift station:

- Density tests with the Troxler density meter will be performed at 100-ft intervals, per 12-in. thick lifts (two 6-in. lifts), along the trenches; and two tests for each 12-in lift in the lift station backfill.

4.4.3 Borrow Source Clay

Additional clay will be provided from an off-site borrow source by the FPD. The proposed off-site clay will be tested, if data is not already available, by taking two samples from the borrow source for development of modified Proctor curves including grain size and Atterberg limits.

The clay compactive effort will be verified by use of the Troxler density meter. In-place field density testing will consist of field density tests performed by the nuclear method (ASTM D3017 and D2922).

4.4.4 Leachate Collection Pipe System

The entire horizontal pipe system, including the driplegs, will be air-pressure tested by the Contractor after installation of the pipe and pipe connections. Air pressure testing will be performed in accordance with the Design plans and Specifications and documented by the Engineer. Individual pipe sections are typically pressure tested during construction to confirm connection methods.

Dripleg DL01 will be installed within the refuse limits at the south side of the landfill. The excavation will generally be backfilled with compacted granular bedding. Clay will be used only if the landfill base liner is compromised, and will include the installation of the clay from the base of the excavation to the top of the existing liner only. A nuclear density/moisture meter will be used to perform the clay compaction (density) tests. The required standard operating procedure (SOP) for the meter is included in Appendix A.

4.4.5 Leachate Well Pumps and Wellheads

The leachate well pumps, controls, and wellheads will be installed based on manufacturers' and suppliers' requirements. The working condition of the pumps and controls will be documented upon completion of installation. Electrical and control system components requirements are described in the Design Specifications.

4.4.6 Lift Station

The lift station excavation may extend into or through the soil liner of the base of the landfill. If this liner is encountered, the excavation will be extended a minimum of 2 ft below the base of the lift station, and 2 ft of clay material will be compacted below and around the lift station as secondary containment. Compacted clay will be placed to the top of the existing base liner and a coarse aggregate material will be used to backfill the lift station above the clay. If the landfill base liner is not encountered, only coarse aggregate will be used to backfill the excavation.

The leachate well pumps, controls, and wellheads will be installed based on manufacturers' and suppliers' requirements. The pumps and controls will be observed to be in working

order upon completion of installation. Electrical and control system components' requirements are described in the Design Specifications.

The existing access road will be upgraded to include a crushed aggregate turn-out constructed to the lift station and work activities will include subbase preparation, aggregate paving and surface water control.

4.4.7 Leachate Holding Tank and Loadout

During the leachate holding tank installation, continuity, and quality testing will be performed by the LCS Contractor, based on Steel Tank Institute guidelines, to demonstrate that the tank is electrically isolated from ground throughout to maintain cathodic protection and warranty. The float switches and interstitial monitoring equipment will be tested in accordance with manufacturers' recommendations. The tank will be pressure tested at the factory and on-site prior to installation. The on-site test will include testing of the conveyance pipe connections to, and including, dripleg DL02. The tank and interstice will be pressure tested as described in the Specifications.

4.4.8 Compressor Station and Electrical and Control System

The LCS control building will be pre-assembled and tested by the manufacturer/supplier at the manufacturer's facility prior to delivery to the landfill. The building will include the compressor and related equipment, LCS electrical service and control panels, and leachate pump volume monitoring capabilities for the wells and lift station. After installation, the working condition of equipment, based on the Design Specifications and manufactures' guidelines, will be documented. All aggregate paving areas and fencing will be observed to meet Design Specifications.

Refer to Table F-2 and F-3 for a summary table indicating the sampling plan for the LCS.

J:\1252\008\04\WP\RPT\98F_SEC4.DOC

5

ANALYTICAL LABORATORY TESTING

5.1 SAMPLING OBJECTIVES

This Section summarizes the sampling objectives, analysis, sample handling and preservation, and QA/QC procedures for sampling during the LCS installation. The Quality Assurance Project Plan (QAPP) contains details of laboratory analytical protocols, QA/QC requirements, and chain-of-custody procedures.

The samples collected for physical and chemical analysis during the LCS construction will be analyzed to provide necessary data to assure that proper materials and efforts are utilized to complete the LCS installation.

5.2 SAMPLE COLLECTION AND CUSTODY PROCEDURES

Samples will be collected and preserved in a manner appropriate for the analyses to be performed (see Table F-2). Sample fractions will be preserved before shipment according to the procedures shown in Table F-2. Preservatives added to the samples will be prepared using reagent grade chemical. Table F-3 should be consulted for details regarding sample packaging and shipping.

The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. As few people as possible will handle the samples.

All containers will be tagged with sample numbers and locations, as defined in Section 6.

Sample tags are to be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample tag, because the ball-point pen would not function in freezing or wet weather.

The Montgomery Watson Field Team Leader will review all field activities to determine whether proper custody procedures were followed during the field work and decide if additional samples are required.

Field logbooks will provide the means of recording data collecting activities performed. As such, entries will be described in as much detail as possible so that persons going to the landfill could re-construct a particular situation without reliance on memory.

Field logbooks will be bound field survey books or notebooks. Each logbook will be identified by the project-specific document number.

The title page of each logbook will contain the following:

- Person to whom the logbook is assigned
- Logbook number
- Project name
- Project start date
- Project end date

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, names of all sampling team members present, level of personal protection being used, and the signature of the person making the entry will be entered. The names of visitors to the site, field sampling or investigation team personnel, and the purpose of their visit will also be recorded in the field logbook.

Measurements made and samples collected will be recorded. Entries will be made in ink and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark and initialed and dated by that person. Whenever a sample is collected or a measurement is made, a detailed description of the location of the station, which includes compass and distance measurements, shall be recorded. The number of the photographs taken of the station, if any, will also be noted. Equipment used to make measurements will be identified, along with the date of calibration.

Samples will be collected following the sampling procedures documented in this CQAP. The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, volume and number of containers. A sample identification number will be assigned prior to sample collection. Field duplicate samples, which will receive an entirely separate sample identification number, will be noted under sample description.

Samples will be accompanied by a properly completed chain of custody form. The sample numbers and locations will be listed on the chain of custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage area.

Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in each sample box or cooler. Shipping containers will be locked and secured with strapping tape and custody seals for shipment to the laboratory. The preferred procedure includes use of a custody seal attached to the front right and back left of the cooler. The custody seals are covered with clear plastic tape. The cooler is strapped shut with strapping tape in at least two locations.

Whenever samples are split with a government agency, a separate chain of custody is prepared for those samples and marked to indicate with whom the samples are being split. The person relinquishing the samples to the facility or agency should request the representatives signature acknowledging sample receipt. If the representative is unavailable or refuses, this is noted in the "Received By" space.

Shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and the pink and yellow copies will be retained by the sampler for returning to the sampling office.

If the samples are sent by common carrier, a bill of lading should be used. Receipts of bills of lading will be retained as part of the permanent documentation. If sent by mail, the package will be registered with return receipt requested. Commercial carriers are not required to sign off on the custody form as long as the custody forms are sealed inside the sample cooler and the custody seals remain intact.

5.3 SAMPLE ANALYSIS AND FREQUENCIES

A summary of the sample matrices, QA/QC samples, analytical parameters, and frequencies of sample collection are located in Table F-2.

5.4 INSTRUMENT CALIBRATION

Calibration procedures and frequencies are located in the August 1996 QAPP previously submitted.

J:\1252\008\04\WP\RPT\98F_SEC5.DOC

6

SAMPLE IDENTIFICATION SYSTEM

6.1 PROJECT IDENTIFIER CODE

A two-letter designator will be used to identify the landfill. The project identifier will be "BW" to signify the Blackwell Landfill. This designator will be used as the first identifier in each sample code.

6.2 SAMPLE DESIGNATIONS

The second designator in each sample I.D. is the sample medium component. The following is a list of sample media and their respective designations:

FDT - Field Density Test location for compacted clay
WC - Waste Classification sample for TCLP analyses

The designators for QA/QC samples are:

TB - Trip blank
FB - Field blank
MS - matrix spike/matrix spike duplicate

Samples will use a consecutive numbering system starting at 01, as designated in the field. The sampling locations will be identified using survey coordinates for the site grid or the sample locations will be related by distance and direction from LCS components. Field blanks, trip blanks and duplicates will use a consecutive numbering system starting at 01, as assigned in the field. Sampling procedures will include chain-of-custody records with date and time, personnel involved, sample identification, and analyses requested.

Clay bag samples will be taken only if needed for borrow source, imported clay and will be designated "CS" for clay sample.

6.3 EXAMPLES OF SAMPLE NUMBERS

Examples of sample number codes are as follows:

- BW-FDT04 = Blackwell Landfill, compacted clay field density test location Sample No. 4

- BW-WC03 = Blackwell Landfill, waste classification sample No. 3 for TCLP analyses

J:\1252\008\04\WP\RPT\98F_SEC6.DOC

7

INSPECTION ACTIVITIES

7.1 PRECONSTRUCTION MEETING

A preconstruction meeting will be held at the landfill prior to beginning LCS (project coordinator) construction. The preconstruction meeting may be attended by the Owner, Engineer, General Contractor, Engineer's representatives, (Field Team Leader and Technical Staff) and U.S. EPA representatives. The Design documents will be reviewed and the responsibility of each party will be reviewed and clearly understood. A recommended agenda with specific topics for the preconstruction meeting is presented in Table F-1. The meeting will be documented by Montgomery Watson and the minutes will be transmitted by mail to all participants thereafter.

7.2 PREFINAL INSPECTION

Within 10 business days of completion of construction of the LCS system the U.S. EPA will be notified and a prefinal inspection meeting will be scheduled for the landfill. The prefinal inspection will be attended by the Owner, Engineer (Project Coordinator), Engineer's representatives, (Field Team Leader and Technical Staff) and U.S. EPA representatives. The prefinal inspection will consist of a walk-through inspection of the entire project area. The prefinal inspection will determine whether the project is being completed consistent with the contract documents. Any outstanding construction items noted during the prefinal inspection will be recorded. A prefinal inspection report will be prepared by the Engineer and will outline the outstanding construction items, actions required to resolve items, completion dates for these items, and the date for the final inspection.

7.3 FINAL INSPECTION

Within 10 business days of completion of any outstanding construction items the U.S. EPA will be notified and a final inspection meeting will be scheduled for the site. The final inspection will be attended by the Owner, Engineer (Project Coordinator), Engineer's representatives (Field Team Leader and Technical staff), and U.S. EPA representatives. The final inspection will consist of a walk-through inspection of the project site. The prefinal inspection report will be used as a checklist and will focus on the outstanding construction items.

J:\1252\008\04\WP\RPT\98F_SEC7.DOC

8

DOCUMENTATION

All aspects relating to construction of the LCS system shall be documented in accordance with Administrative Order by Consent (AOC), U.S. EPA Docket No. V-W-96-C-341, in Appendix A of the Design (Volume I of II). The Field Team Leader must document that all requirements of this CQAP have been addressed and satisfied.

The Field Team Leader must provide signed daily field reports, data sheets, and checklists to verify that all testing, sampling and documentation activities have been carried out. The Field Team Leader must maintain at the job site a complete file of all documents that comprise or support this CQAP, including Design plans and Specifications, checklists, test procedures, daily logs, and other pertinent documents.

All original construction related documents will be stored by the Engineer.

8.1 DAILY REPORTS

Daily field reports will be prepared by the Field Team Leader to document the activities performed on-site. Daily field reports must include:

- Observation and testing data sheets
- Discussions of significance between General Contractor and Field Team Leader
- Documentation of construction problems and resolutions

At a minimum, the daily data sheets must include the following information:

a. An identifying Drawing (or Specification) sheet (or page) number for cross-referencing and document control

b. Date, project name, location, and other project identification information

c. Documentation of weather conditions

d. Reduced-scale site plan showing all current work areas and test locations

e. Descriptions and locations of ongoing construction

f. Equipment and personnel in each work area, including subcontractors

g. Descriptions and specific locations of areas, or units, of work being tested and/or observed and documented

h. Locations where tests and samples were taken

i. Summary of field test results

j. Calibrations or recalibrations of test equipment, and actions taken as a result of calibration

k. Off-site materials received, including quality verification documentation

l. Decisions made regarding acceptance of units of work, and/or corrective actions to be taken in instances of substandard quality

m. Signature of Field Team Leader

Photographic reporting data sheets, where used, must be cross-referenced with the daily reports. The photographs will serve as a pictorial record of work progress, problems, and mitigation activities. The Engineer's file will contain color prints labeled on the back with a description of the photo and the negatives.

8.2 CONSTRUCTION

Reporting of construction problems and corrective measures will be cross-referenced with specific daily field reports and must include the following information:

- An identifying sheet number for cross-referencing and document control
- A detailed description of the situation or deficiency
- The location and probable cause of the situation or deficiency
- How and when the situation or deficiency was found or located
- Documentation of the response to the situation or deficiency
- Final results of any response
- Any measures taken to prevent a similar situation from occurring in the future
- Signature of the Engineer's Site Representative and Contractor

The Engineer must be made aware of any significant reoccurring non-conformance with the design and specifications.

8.3 FIELD TESTING REPORTS

Records of field and laboratory testing performed on components of the LCS system must be collated by the Engineer's Field Team Leader. A summary list of test results will be prepared by the Engineer's Field Team Leader on an ongoing basis, and submitted to the Engineer for inclusion with other applicable reports. Refer to Design text for required reports.

8.4 FINAL STORAGE OF RECORDS

Final records of the construction of the LCS system will be maintained in the Engineer's files. Copies of reports and other submittals will be retained by the Owner, and the U.S. EPA representatives.

J:\1252\008\04\WP\RPT\98F_SEC8.DOC

9

FIELD DECONTAMINATION PROCEDURES

9.1 DECONTAMINATION STATION AND DISPOSAL OF MATERIALS

The determination of the proper levels of protection for each LCS installation activity will be dependent on the responses from the site safety monitoring. LCS installation will likely be performed in Level D protection (refer to the Site Safety Plan in Appendix E of the Design).

A decontamination area will be designated or constructed to contain rinse waters from vehicle decontamination. The rinse waters and purge waters will be stored on-site until arrangements are made for proper disposal.

9.2 DECONTAMINATION OF EXCAVATING EQUIPMENT

Decontamination of excavating equipment before it leaves the site will be the responsibility of the Contractor. Decontamination of excavating equipment will be performed on a temporary decontamination pad constructed by the contractors prior to demobilizing from the site. Run-off from the pad will be containerized and stored on-site until it is properly removed from the site and disposed of at the Wheaton Sanitary District Sewerage Treatment Plant.

9.3 DECONTAMINATION OF SAMPLING EQUIPMENT

Sampling equipment for waste characterization samples will be decontaminated between each sample. Decontamination will be performed by scrubbing the equipment in an alconox, or Liquinox, solution and then rinsing with potable water. These procedures may be performed at the location where the sampling is occurring.

DRF/djh/DWH/WGB/PJV
J:\1252\008\04\WP\RPT\98F_SEC9.DOC
1252008.0409.0059-MD

TABLES

TABLE F-1

Proposed Preconstruction Meeting Agenda

1. Introduction
   A. Identify Parties
      1. Owner (Forest Preserve District of Du Page County)
      2. Engineer (Montgomery Watson)
      3. Engineer's Site Representative (Field Team Leader)
      4. Engineer's Technical Lead Staff
      5. General Contractor
      6. U.S. EPA representatives

2. Tour Project Site

3. Distribute Documents
   A. Construction Drawings and Specifications
   B. Construction Quality Assurance Plan (CQAP)
   C. Site Safety Plan

4. Define Lines of Communication
   A. Proper channels of communication between parties involved
   B. Procedures for documentation and reporting information
   C. Distribution and storage of documents and reports
   D. Progress meetings
   E. Procedures for approving design changes during construction
   F. Procedures for approving wells, earthwork, piping, and blower

5. Review Site Requirements
   A. Safety rules
   B. Site rules
   C. Work schedule
   D. Storage of materials
   E. Available facilities

TABLE F-1
(Continued)

6. Review Construction Issues
   A. Scope of Work
   B. Construction Drawings and Specifications
   C. Construction procedures
      1. Location of stockpile areas
      2. Proposed construction sequencing
      3. Equipment and equipment decontamination
   D. Construction schedule
   E. Procedures for preparing and approving change orders
   F. Site Safety Plan

7. Select Testing Equipment, Review Sampling and Testing Procedures (CQAP)

8. Review Construction Quality Assurance Plan (QAPP Addendum No. 1)
   A. Piping/Trenching
   B. Earthwork
   C. LCS Components

9. Establish Project Deliverables
   A. Responsibilities
      1. Owner (FPD)
      2. Engineer (Montgomery Watson)
      3. Engineer's Site Representative (Field Team Leader)
      4. Engineer's Technical Lead Staff
      5. General Contractor
      6. U.S. EPA representatives
   B. Distribution of deliverables
   C. Approval procedures
   D. Minutes of meetings from the CQA Engineer

TABLE F-2

Sampling Plan
Final Design Blackwell Forest Preserve Landfill
DuPage County, Illinois

Matrix	Lab[2]	No. of Samples[7]	Field Duplicates[4]	Field Blank[5]	Total No. Samples	Laboratory Parameters[2]	Field Parameters
Waste Characterization	First Envir.	Unknown	Unknown	Unknown	Unknown	TCLP[1][3]	HNu (11.7 eV)
Compacted Clay (borrow, off-site)	TSC	2	None	None	2 Min.	Grain Size, Atterberg	None
Compacted Clay (all backfill)	--	Unknown	None	None	Unknown	--	Field Density (Troxler)

General Notes:

1. Unless otherwise noted, samples will be considered low concentrations, and will be packaged and shipped accordingly.
2. Lab address and telephone number:
   - First Environmental Laboratories (First Envir.)
     1600 Shore Road
     Naperville, IL 60563 (708) 778-1200
   - Testing Service Corp. (TSC)
     457 East Gundersen Drive
     Carol Stream, IL 60188 (708) 462-2600
3. Trip blanks are not included in the total number of samples.
4. Field duplicates will be collected at a ratio of one field duplicate for each 10 investigative samples collected.
5. Field blanks will be collected at a ratio of one field blank for each 10 investigative samples collected.
6. Refer to Table 7-1 for method reference. Refer to Table 1-2 for sample volume and preservation requirements (August 1996 QAPP).
7. Number of samples is approximate. Actual numbers are based on field observations.

TABLE F-3

Sample Quantities, Containers, Preservatives, and Packaging Requirements
Final Design Blackwell Forest Preserve Landfill
DuPage County, Illinois

Analysis	Bottles & Jars	Preservation	Holding Time[1]	Volume	Shipping	Packaging[2]
Waste Characterization TCLP VOCs	4-oz. vials	iced to 4°C	14 days from sampling date	Fill completely, no headspace	Shipped overnight carrier	Vermiculite
TCLP SVOCs, Metals, Corrosivity, Reactivity, Flammability	Two 1-qt amber glass bottles	Iced to 4°C	14 days from sampling date	Fill to shoulder of bottle	Shipped overnight carrier	Vermiculite
Clay Soils Grain Size, Atterberg	5-lb, sample bag	None	None	Full	Shipped overnight carrier	Vermiculite
Modified Proctor	50-lb sample bag	None	None	Full	Shipped overnight carrier	Vermiculite (Fragile!)

General Notes:

1. Holding time begins at the time the sample is collected.
2. The packaging material should completely cushion the sample bottles - bottom, sides, and top.

DRF/vlr/PJV
J:\1252\008\04\WP\TBL\99_TBL3.DOC
1252008.0409.0059-MD

A

STANDARD OPERATING PROCEDURE NUCLEAR DENSITY METER (TROXLER)

TROXLER OPERATION PROCEDURES

Lock should be kept in the Troxler handle at all times when in storage and transporting.

Meter should be kept in a locked case and chained to the truck bed when transporting.

Keep a lock on meter case/box at all times when not in use.

Keep all unauthorized persons 15 ft from meter when in use.

Keep the meter storage cabinet locked at all times.

No nuclear meter should be stored at or in an individual's home.

Use dosimeter at all times.

Each individual should have an "3430 Series Instruction Manual".

Place radioactive II yellow sticker on meter transporting case. Get one if it has come off.

Keep these items with meter and vehicle: NRC license, shipping form, Type A package cert, latest leak test results, radioactive source cert.

Transport the meter at least 2 ft from passengers (or as far away as practical).

Periodically review handling and safety procedures. Review the instruction manual.

Record standard counts on Troxler log books when you use machine (always).

Perform weekly/monthly machine maintenance. Keep it clean to allow smooth operation.

Do not hammer on leveling plate. This will cause it to bow.

Have new leveling plate ordered if yours is worn out. Do not use it.

Do not jerk up on Troxler handle when removing probe from ground. Bring up slowly. This will allow the ring in the lower plate to do a better job cleaning the rod and reduce wear.

JAL/cah/JAL
[mad-700-223]

TROXLER OPERATION NOTES

Problems in getting a correct standard count

1. Let the meter warm up for 15 min before calibration. The sensors work differently after warm up.

2. Do not place the meter too close to another nuclear meter. They pick up readings from each other. Fifty feet is a good distance.

3. Place the meter on standard block properly. There may be have an air gap under the meter.

4. Check for foreign material stuck to the bottom of meter. It may create air gap under the meter.

5. Do not place the standard block on low density material. The block should be a dense flat surface. This is the way it is designed.

6. Do not place the meter too close to a building or vehicle. Large items will reflect particles back to the meter.

7. Conduct the standard count over a 5 min time period. The output of the sources vary but are more constant over longer periods.

8. Make sure the source is in place. If the source is not securely locked in the meter, the geometry of the standard count is changed and readings will be different.

Increasing Field Density Test Accuracy

1. Have a smooth, flat, void free surface. The air density will be averaged in with the soil.

2. Pound the probe hole perpendicular to the ground surface. A angled hole will be difficult to insert the meter and may prevent a good contact between meter and the ground.

3. Pound the probe hole 1 to 2 in. deeper than the probe length. This is how the meters are calibrated in the factory and will allow easy insertion of the probe to the desired depth.

4. Use the probe rod as deep as possible. A 1 ft layer is usually tested so depth of the probe should be 8 to 12 in.

5. Keep the meter several feet away from embankments or trench walls. The meter will record reflected particles in addition to the normal readings.

6. Avoid air gap between probe and soil (i.e., hole is bigger than probe). The meter should be pulled toward the user so there is no air gap between the probe and sensors.

7. Run periodic moisture checks. Sand cone or natural moisture checks will let you know if the meter is functioning properly.

8. Record and monitor the standard count daily. You need to take a standard count to run the meter. Widely varying standard counts indicate an incorrect standard count or meter malfunction.

9. Watch for plastic or organic material mixed with soil. These materials contain hydrogen and soil minerals typically do not in the midwest. This could result in an elevated moisture reading and a decreased density.

10. High densities may indicate a rock below meter. Concrete has a density of 145 lb/ft^3 and granite has a density of 160 lb/ft^3 or more. Be careful when recording compaction much over 100%. If no rock has elevated the density may be another proctor is necessary.

Keeping Important Records

1. Record <u>every</u> standard count in the record book. These must be on record for the DNR and can be used to indicate a meter malfunction.

2. Record low battery dates. A battery malfunction may be indicated.

3. Record time and duration of charge. A malfunctioning battery may be indicated or the record will tell the user that the meter should be charged before being taken out into the field.

4. Record the job number and date each time you record the standard count. This will provide a record of where and how often a meter was used.

JAL/cah/JAL
[mad-700-224]
12340/60000

PROCEDURES FOR FILLING OUT NUCLEAR FIELD DENSITY TESTS FORMS (TROXLER TESTS)

A sample form is attached with spaces on the form numbered. Comments relating to each space are summarized below.

1. The **Job Name** can be one or two words which will readily identify the job and should be on all sheets.

2. The **Job Number** should be on all sheets. Each job should have a separate sheet.

3. The **Troxler Number** should be on each sheet.

4. **Your Name** should be on each sheet.

5. The **Standard Counts** should be on each sheet. This should be included each time a machine is calibrated to enable us to track machine performance. Use the Troxler standard block placed over a solid concrete sub-base.

6. The **Date** should be placed above each test.

7. **Test Number** - Preferably the tests should be numbered sequentially from the beginning of the job. However, renumbering or relettering each series of tests starting with 1 or A would also be acceptable if you can renumber them correctly at a later date.

8. **Areas Filled** - Such as liner, cover, sidewall, manhole fill, Lysimeter fill, etc.

9. **Test Location** - Give a description, preferably a coordinate. If helpful in clarifying locations, maps should be drawn on field reports. Locations should be determined by pacing or measuring from a suitable reference point.

10. The **Lift Number** should be recorded for each test.

11. The **Elevation** refers to the elevation at the top of the test. For example, on sand cone tests the elevation would be the elevation of the plate. For nuclear tests, the elevation should refer to the base of the nuclear meter.

12. **Depth** - The depth is measured from the top of the fill at the time of the test to the base for the meter (or the plate in the case of sand cone tests). Depths should generally be reported in inches. Be consistent; do not use 2 ft in one case and 24 in. in another.

13. **Source Rod Depth** - For clay documentation the depth should be 8 to 12 in. Any less is frowned upon by the DNR.

14. **Soil Description** - Be sure to put in a soil description or mark, for example, "same as test A". When writing all descriptions try not to abbreviate too much and write clearly.

    The standard abbreviations are as follows:

CL	Clay
SI	Silt
SA	Sand
GR	Gravel
CO	Cobbles
F	Fine
M	Medium
C	Coarse
TR	Trace (0-5%)
LTL	Little (5-12%)
SO	Some (12-35%)
and	And (35% and up)

15. **Wet Density** - Round off to **nearest tenth of lb/cf.**

16. **Dry Density** - Round of to **nearest tenth of lb/cf.**

17. **Moisture, %** - Round of to **nearest tenth of a percent.**

18. **Maximum Density** - You must be reasonably certain that the maximum density used from previous samples is applicable to the current test. If you are unsure, or if the material is particularly variable, samples should be obtained at each test location in question so that Proctors can be pounded as needed. Round off to **nearest lb/cf.**

19. **% Compaction** - Round off to **nearest percent.**

20. List **Specific Compaction** - Round off to the **nearest percent.**

21. **Remarks** - Examples would include "need re-test", or "re-test or test 17", or "discussed with contractor will re-compact".

22. This space is provided for determining the percent moisture of bag samples.

JAL/cah/JAL
[mad-700-222]
12340/60000

B

FIELD REPORT FORMS

MONTGOMERY WATSON

MADISON
ONE SCIENCE COURT
P.O. BOX 5385
MADISON, WI 53705
608/231-4747
FAX 608/231-4777

DATE	JOB NO.
PROJECT	
LOCATION	
CONTRACTOR	OWNER
WEATHER	TEMP. °at AM °at PM
PRESENT AT SITE	

TO _____

THE FOLLOWING WAS NOTED:

COPIES TO _____

FIELD REPORT

MONTGOMERY
WATSON

FIELD DENSITY TESTS (Nuclear Method Field Forms)

Job_____ Machine No._____ Technician_____

Job No._____ Sheet_____ of _____ Counts_____ / _____ Checked by:_____

Date					
Test					
Areas Filled					
Test Location					
Lift. No.					
Elevation					
Depth					
Source Rod Depth					
Soil Description					
Wet Density					
Dry Density					
% Moisture					
Maximum Density					
% Compaction					
Specified Compaction					
Rod Penetration					
Remarks Pan # Tare + W.S. Tare + D.S. Tare					

G

G

QUALITY ASSURANCE PROJECT PLAN ADDENDUM NO. 1

LEACHATE COLLECTION SYSTEM QUALITY ASSURANCE PROJECT PLAN ADDENDUM NO. 1

BLACKWELL FOREST PRESERVE LANDFILL
DUPAGE COUNTY, ILLINOIS

MAY 1997

PREPARED FOR:
FOREST PRESERVE DISTRICT
DUPAGE COUNTY, ILLINOIS

• • •

PREPARED BY:
MONTGOMERY WATSON
ADDISON, ILLINOIS

PROJECT NO. 1252008.0409

LIST OF ACRONYMS/ABBREVIATIONS

ARARs	Applicable or Relevant and Appropriate Requirements
ASTM	American Standards for Testing Materials
CLP	Contract Laboratory Program
CRDL	Contract Required Detection Limits
CRQL	Contract Required Quanitation Limits
DO	Dissolved Oxygen
DQO	Data Quality Objective
EM	Electromagnetic Survey
ES-ANL	Energy Systems Division (Argonne National Laboratory)
FPD	Forest Preserve Districts (DuPage County)
FSP	Field Sampling Plan
GC	Gas Chromatography
IAC	Illinois Administrative Code
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NPL	National Priority List
PID	Photoionization Detector
PWD	Public Works Department (DuPage County)
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
RPD	Relative Percent Difference
SOP	Standard Operating Procedure
SOW	Statement of Work
SW846	Test Methods for Evaluating Solid Waste 1986.
SVOC	Semivolatile Organic Compounds
TAL	Target Analyze List
TCL	Target Compound List
TIC	Tentatively Identified Compound
TSC	Testing Services Corp.
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

TABLE OF CONTENTS

LIST OF TABLES

1

INTRODUCTION

A QAPP for the Pre-Design Investigation Work Plan at the Blackwell Landfill was prepared and submitted by Montgomery Watson (August 1996). The QAPP presented the organization, objectives, functional activities, and specific quality assurance (QA) and quality control (QC) activities associated with the predesign work. The QAPP also described the specific protocols which will be followed for sampling, sample handling and storage, chain of custody, and laboratory and field analyses. This Addendum No. 1 has been prepared to supplement the August 1996 QAPP to provide information for the additional work associated with Expedited Work Plan and Final Design (Design) for the leachate collection system (LCS). Only additional applicable details have been included with this Addendum. Complete information is available in the August 1996 QAPP.

J:\1252\008\04\WP\RPT\98G_TEXT.DOC

2

QUALITY ASSURANCE PROJECT PLAN

All information presented in the August 1996 QAPP is applicable to the LCS Design submittal, with addended information presented below.

2.1 PARAMETERS TO BE TESTED AND FREQUENCY

A summary of sample matrices, analytical parameters, and frequencies of sample collection can be found in Table G-1. A summary of sample volume, bottle, preservative, and packaging requirements is provided in Table G-2.

2.2 DATA QUALITY OBJECTIVES

Refer to Table G-3 for a summary of data generating activities and associated data quality objectives.

2.3 PROJECT SCHEDULE

A schedule of the LCS installation activities is presented in Figure 1 of the Design in Volume I of II.

2.4 PROJECT ORGANIZATION AND RESPONSIBILITY

Refer to the CQAP (Appendix F of Volume I of II) for project organization and responsibility information.

2.5 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The number of duplicate and field blank samples to be collected are listed in Table G-1. Sampling procedures are specified in the CQAP (Volume III of III). The level of QC effort provided by the laboratory will be equivalent to the level of QC effort specified in Table 3-2 of the August 1996 QAPP.

2.6 SAMPLING PROCEDURES

Sampling and testing procedures for the clay and waste characterization samples collected during LCS installation are further described in the Design and the CQAP.

Waste/refuse samples collected during field sampling activities will be analyzed by First Environmental Laboratory. Soil samples collected for the LCS installation will be analyzed by Testing Service Corporation (TSC). Refer to Table G-1 for matrices; parameters, and laboratories performing the analysis. Refer to the August 1996 QAPP for additional information.

DRF/vlr/DWH/WGB/PJV
J:\1252\008\04\WP\RPT\98G_TEXT.DOC
3920.0050-MD

TABLES

TABLE G-1

Sampling Plan
Final Design Blackwell Forest Preserve Landfill
DuPage County, Illinois

Matrix	Lab[2]	No. of Samples[7]	Field Duplicates[4]	Field Blank[5]	Total No. Samples	Laboratory Parameters[2]	Field Parameters
Waste Characterization	First Envir.	Unknown	Unknown	Unknown	Unknown	TCLP[1][3]	HNu (11.7 eV)
Compacted Clay (borrow, off-site)	TSC	2	None	None	2 Min.	Grain Size, Atterberg	None
Compacted Clay (all backfill)	--	Unknown	None	None	Unknown	--	Field Density (Troxler)

General Notes:

1. Unless otherwise noted, samples will be considered low concentrations, and will be packaged and shipped accordingly.
2. Lab address and telephone number:
   - First Environmental Laboratories (First Envir.)
     1600 Shore Road
     Naperville, IL 60563 (708) 778-1200
   - Testing Service Corp. (TSC)
     457 East Gundersen Drive
     Carol Stream, IL 60188 (708) 462-2600
3. Trip blanks are not included in the total number of samples.
4. Field duplicates will be collected at a ratio of one field duplicate for each 10 investigative samples collected.
5. Field blanks will be collected at a ratio of one field blank for each 10 investigative samples collected.
6. Refer to Table 7-1 for method reference. Refer to Table 1-2 for sample volume and preservation requirements (August 1996 QAPP).
7. Number of samples is approximate. Actual numbers are based on field observations.

TABLE G-2

Sample Quantities, Containers, Preservatives, and Packaging Requirements
Final Design Blackwell Forest Preserve Landfill
DuPage County, Illinois

Analysis	Bottles & Jars	Preservation	Holding Time[1]	Volume	Shipping	Packaging[2]
Waste Characterization TCLP VOCs	4-oz. vials	iced to 4°C	14 days from sampling date	Fill completely, no headspace	Shipped overnight carrier	Vermiculite
TCLP SVOCs, Metals, Corrosivity, Reactivity, Flammability	Two 1-qt amber glass bottles	Iced to 4°C	14 days from sampling date	Fill to shoulder of bottle	Shipped overnight carrier	Vermiculite
Clay Soils Grain Size, Atterberg	5-lb, sample bag	None	None	Full	Shipped overnight carrier	Vermiculite
Modified Proctor	50-lb, sample bag	None	None	Full	Shipped overnight carrier	Vermiculite (Fragile!)

General Notes:

1. Holding time begins at the time the sample is collected.
2. The packaging material should completely cushion the sample bottles - bottom, sides, and top.

DRF/vlr/PJV
J:\1252\008\04\WP\TBL\99G_G-2.DOC
1252008.0409.0059-MD

TABLE G-3

Summary of Data Generating Activities and Associated Quality Objectives
Leachate Collection System - Blackwell Forest Preserve Landfill
DuPage County, Illinois

Activity	Description	Intended Data Usages	Parameter	Data Quality Objective	Number of Samples
Waste Characterization					
	Collect a composite refuse sample if to be disposed of off-site	Determine character of waste	TCLP VOCs, SVOCs, Herbicides, Pesticides, metals, pH, cyanide, sulfide, flash pt., paint filter test	2	See Table G-1
Compacted Clay	Clay Borrow Sampling verification during placement	Assess quality of imported clay and placement	Grain size, Atterberg limits and modified Proctor	2	See Table G-1

General Notes:

1. Refer to Tables G-1 and G-2 for parameter lists and required detection limits.
2. Additional testing may be required by the waste facility selected to receive the waste.

DRF/vlr/PJV
J:\1252\008\04\WP\TBL\99G_G-3.DOC
1252008.0409.0059-MD